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INDEX TO CONTENTS

The Determination of True Free Sulphur and the True Coefficient of Vulcanization in Vulcanized Rubber	501
The Coming Rubber Shortage	503
Loads for Airplane Tires	504
Rubber Division Meets in Chicago	505
The Growth of the Rubber Industry in Japan	506
Types of Tires and Tubes in Use Abroad	507
The Preservation of Vulcanized Rubber	509
Export Possibilities for Rubber Manufacturers	511
Future Rubber Research	513
National Exposition of Chemical Industries	515
The Rubber Industry in Sumatra and Malaya	518
Goodyear Sales Increase	519
New Amazon Cords and Fabrics	519
French Purchases Bucyrus	519
Rubber Imports for August	520
International Reduces Prices	520
Industrial Research on Black Pigments	521
Coast Tire Increases Capital	521
Denman-Myers Factory in Production	521
MARKETS	
Manufactured Rubber Goods	525
Cottons, Yarns and Fabrics	525
Chemicals and Compounding Materials	526
Crude Rubber	527
Scrap Rubber	528
American Rubber Patents	528

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THE RUBBER AGE AND TIRE NEWS

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The Determination of True Free Sulphur and the True Coefficient of Vulcanization in Vulcanized Rubber

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Sulphur in vulcanized rubber has generally been considered as present in two forms, the so-called free and the combined sulphur. It has been realized for some time, however, that sulphur which was called free and hence, implicitly at least considered available for further vulcanization, did not exist entirely in the elementary form. It is evident that during vulcanization the sulphur will react with other materials present, such as resins, proteins, organic and inorganic accelerators, and fillers. This naturally removes a certain amount of sulphur from active particiipation in the reaction between rubber and sulphur. All of the inorganic compounds will be insoluble in acetone; hence, unless, a corerection is made for the sulphur present as sulphide or sulphate, the results on the coefficient of vulcanization will be high. The reaction products of sulphur with the resins, proteins, and organic accelerators may be wholly or partly soluble, or entirely insoluble in acetone, and any of the old methods which did not take into account their formation gave erroneous results for free and combined sulphur.

Furthermore, any compounds formed by the reaction between sulphur, resins, proteins, etc., will, on heating, give up their sulphur in the form of H_2S or some other compound, and never as elemental sulphur. Hence, although the compounds may decompose, no sulphur, once combined, becomes available for further vulcanization unless there is an oxidizing agent present, an extremely rare condition in the vulcanization of rubber. The liberation of sulphur from polysulphide is not considered in this paper. The behavior of accelerators, fillers, etc., is being investigated along the lines laid down, and the work is confined for the present to stocks which are made up of rubber and sulphur only.

It is the object of this paper to present two methods, one for the true free sulphur determination and the other for a more accurate figure for the coefficient of vulcanization than could be obtained by the older methods.

It is evident from the foregoing remarks that the sulphur present in vulcanized rubber may be divided into four parts: Sulphur soluble in acetone:

(1) Combined with resins and proteins
(2) True free sulphur

Sulphur insoluble in acetone:

(1) Combined with rubber
(2) Combined with resins and proteins

Methods for Determining True Free Sulphur

Considering first the sulphur which is soluble in acetone, it is evident that a solvent which would dissolve either the sulphur or the organic material (part of which may contain sulphur of combination) without affecting the other, would solve the problem. Unfortunately, all solvents for either will disolve both to a greater or less extent. The entire extract very readily dissolves in 95 per cent alcohol. The alcohol will also dissolve about 0.04 g. of sulphur in 100 cc., the amount of sulphur usually obtained in an ordinary analysis. If, however, the extract is treated with alcohol already saturated with sulphur, it will dissolve all of the organic material present but none of the elementary sulphur. The sulphur remains in the flask after the solution is decanted, and can be weighed as such or oxidized and weighed as barium sulphate.

Preparation of Saturated Alcohol

The saturated solution of sulphur in ethyl alcohol, to be referred to as "saturated alcohol," is made by heating an excess of sulphur with the alcohol for about 3 hours at 70° to 75°C. and allowing to cool slowly to room temperature. Before used it is allowed to stand at least 24 hours in order to insure complete crystallization of the dissolved sulphur. As all later crystallizations are carried out at room temperature a variation of a few degrees in the temperature at which equilibrium is reached does not materially affect the results. As a precaution, however, the solution is kept in contact with solid sulphur to insure saturation at all times.

TABLE I

	Soluble in Acetone but Insoluble in Saturated Alcohol				
Total Acetone-Soluble Sulphur	*a*	*b* (1 Hr.)	*c* (8 Hrs.)	*d* (24 Hrs.)	*e*
3.22	2.17	2.29	2.48	2.69	3.22
3.29	2.17	2.30	..	2.79	3.06
3.22	2.19	..	..	..	3.08
3.24	**2.19**	..	..	..	2.93
3.28	2.27	..	..	..	..
3.28	2.27	..	..	..	..
3.26	2.28	..	..	..	..
3.22	2.33	..	..	..	..
3.26	2.35	..	..	..	..
3.21	2.39	..	..	..	..
Av., 3.248	2.40	..	..	..	..
	2.42	..	..	..	..
	2.44	..	..	..	..
	2.64	..	..	..	..

A one-gram sample of the ground rubber is extracted with acetone for 16 hours in an Underwriters' apparatus. The acetone is distilled off, the residue dried at 60° to 65° for half an hour and treated with 50 cc. of saturated 95 per cent alcohol, and the flask and contents weighed. An accuracy of 0.5 g. is sufficient for this weighing. It is then warmed to about 50° C. for a few minutes to insure complete solution of all the organic material and allowed to cool slowly to room temperature. Before it has reached this temperature the flask is again weighed and any alcohol lost during the heating is replaced with pure 95 per cent alcohol. The flask is then well covered and allowed to stand for 24 hours to permit the complete crystallization of any of the elementary sulphur of the extract which may have dissolved. The liquid is then carefully decanted, and the residue washed two or three times by decantation with 5 cc. of saturated alcohol and dried. It may then

* Paper read before Rubber Division at the 59th Meeting of the American Chemical Society, St. Louis, Mo., April 12 to 16, 1920. Courtesy of the *Journal of Industrial and Engineering Chemistry*.

be weighed directly, or oxidized and weighed as $BaSO_4$. It is unnecessary to wash the residue with pure alcohol inasmuch as the amount of sulphur left by the evaporation of the saturated alcohol is very slight. One cc. of 95 per cent alcohol will dissolve only 0.0004 g. of sulphur and it is easily possible to decant the liquid so that not over 0.5 cc. will remain in the flask. The results obtained by this method are given in Table I.

Discussion of Results

The closely checking figures for total free sulphur prove that the acetone extraction was complete and that the method of oxidation with nitric acid plus bromine is suitable for this determination.

For the sulphur insoluble in saturated alcohol the figures vary between 2.17 and 3.22 per cent and have been divided into four classes, according to slight modifications in procedure. The results listed under *a*, varying from 2.17 to 2.64 per cent, were the first obtained. This variation is altogether too great to permit the general use of the method employed. As the theory is sound, there must be some error in manipulation. The first possible place for error is in the control of the temperature of the saturated alcoholic solution of the extract during the crystallization of the sulphur. A control within 2° did not, however, improve the results, that is, the temperature coefficient of the solubility of sulphur in alcohol is less than the other experimental errors. The next point was the rate of crystallization of the sulphur. Solutions of the acetone extract in saturated alcohol were allowed to stand 1, 8 and 24 hours before decanting and washing. The figures in columns *b*, *c*, and *d* show that for accurate results a 24-hour crystallization is necessary.

As a check on the method, one sample was run by rapidly washing out the organic material of the acetone extract with a very small amount of cold alcohol. A total of about 8 or 10 cc. was used and the entire operation of three washings did not take more than 4 or 5 minutes. The residual sulphur was oxidized and weighed as barium sulphate, giving 2.81 per cent of true free sulphur, a value which checks with that obtained from the 24-hour crystallization from saturated 95 per cent alcohol.

Determining Effect of Temperature

The effect of the temperature used for drying the acetone extract before treatment with saturated alcohol was determined by drying four samples at temperatures ranging from 75° to 90°C. The results given in column *e* vary between 2.93 and 3.22 per cent, showing that at these temperatures some reaction takes place between the sulphur and the resins, forming alcohol-insoluble compounds. The sulphur remaining insoluble in the alcohol from overheated samples is never pure yellow as is that from samples which were dried below 65° C., indicating that if dried at too high a temperature some of the organic material is insoluble in the alcohol. To obtain accurate results the total acetone extract should not be dried at temperatures above 65° C., or for more than half an hour in a well-ventilated oven.

It was decided that if a more dilute alcohol would dissolve all the organic material and less sulphur than the 95 per cent alcohol, the error introduced in case crystallization was complete would be smaller. It was found that 100 cc. of 75 per cent alcohol would dissolve only 0.008 g. of sulphur, as compared with 0.040 for the 95 per cent alcohol. The 75 per cent solution also completely dissolved the organic matter in the extract. Upon substituting "saturated" 75 per cent alcohol, the results were 2.80, 2.85, 2.83, 2.84, 2.85, and 2.82, averaging 2.833. In these determinations the solution of resins, etc., in the saturated 75 per cent alcohol was allowed to stand only 3 hours to complete the crystallization of the sulphur before decanting and washing.

The results check very well with the 24-hour crystallization from 95 per cent saturated alcohol, and with the one obtained by quick washing with pure 95 per cent alcohol.

A 24-hour crystallization from the saturated 75 per cent alcohol yielded the following results: 2.86, 2.84, 2.80 and 2.79, averaging 2.823.

The most concordant results are evidently obtained from 75 per cent alcohol. Their correctness is established by the checks obtained with the different methods.

[1] Hinrichsen and Memmler, "Der Kautschuck und seine Prufung."
[2] *Kolloid-Z.*, 9, 300.

	Per cent
24-hr. crystallization from saturated 95 per cent alcohol	2.74
Rapid wash with 95 per cent alcohol	2.81
3-hr. crystallization from saturated 75 per cent alcohol	2.83
24-hr. crystallization from saturated 75 per cent alcohol	2.82

The figure thus obtained is the value of the true free or elemental sulphur which is available for further vulcanization of the rubber. The remainder of the acetone-soluble sulphur is combined with resins, etc., and does not participate in further vulcanization.

Coefficient of Vulcanization

The combined sulphur in rubber stocks has been considered to be the sulphur which was not extractable with acetone. In case organic sulphides were present a correction was made. As stated above, however, it is posible that some of this sulphur may be combined with resins and proteins in acetone-insoluble compounds. Hence, a method whereby the residual sulphur could be determined after these compounds had been separated from the rubber would give a much better value for the coefficient of vulcanization.

It has been shown[1] that about 85 per cent of the resin of Hevea rubber is saponifiable. Such being the case it is probable that part at least of any resin-sulphur compounds which are insoluble in acetone would also be saponifiable and rendered soluble in alcoholic potash. The protein matter will also be hydrolyzed and some of these products will dissolve in the alcoholic solution. In any case any sulphur extracted by this method will not be sulphur which has been combined with the rubber. The many failures to remove the combined sulphur by any means substantiate this view. The experiments of Spence[2] show that all of the free sulphur is extracted by acetone in about 8 hours, and hence it is probable that 16-hour extraction will remove every trace of it.

A few experiments showed that from the stock used to determine the true free sulphur, alcoholic potash would remove an additional 0.30 to 0.35 per cent of sulphur. In order to show that this was not due to the removal of sulphur combined with the rubber or to the disintegration of the sample, successive extractions were run on the same piece. Two 4-hour extractions removed all the sulphur, absolutely no precipitate of barium sulphate being obtained when the third and fourth extracts were oxidized and treated with barium chloride.

Details of Method

A one-gram sample of ground rubber is extracted 16 hours with acetone and the residue dried. It is then boiled for 8 hours with 75 cc. of a 5 per cent alcoholic potash solution and washed once or twice with hot alcohol. As the removal of the last traces of alkali is very difficult the sample is extracted 16 hours (over night) with alcohol in an Underwriters' apparatus. The solutions are then mixed and the alcohol distilled off. The residue is oxidized first with 15 cc. of a solution of bromine in potassium bromide (120 KBr and 160 g. Br_2 in 1 liter of water) in order to prevent the violent action of fuming nitric acid on alkali, and finished with nitric acid. The barium sulphate is precipitated in the usual manner.

As there is always considerable silica formed from the glass it is necessary to evaporate twice with hydrochloric acid, thoroughly dehydrate, and remove the silica before precipitating the sulphate.

The results obtained by this method (Table II) show very good agreement.

TABLE II

Sulphur Insol. in Acetone, Sol. in Alc. KOH	Sulphur in Residue (Per cent Combined S)	Total Acetone-Insol. Sulphur Per cent
0.32	2.06	2.43
0.37	2.07	2.39
0.38	2.01	Av., 2.41
0.36	2.03	
0.32	Ave., 2.04	
0.30		
0.32		
0.34		
0.34		
Av., 0.34		

The sum of the sulphur in the alcoholic potash and that left in the rubber is 2.38 per cent, which checks very well with the direct result on the total acetone-insoluble sulphur, *viz.*, 2.41 per cent.

(*Continued on Page 504*)

The Coming Rubber Shortage

A leading firm of English stockbrokers has issued a circular, under this title pointing out that the very heavy plantings that took place in the East in the years following the rubber boom of 1910 have now reached the bearing stage and that future annual increases in the supply of the raw material will be at a much smaller rate than hitherto. They present the statement given below showing that well over three-fourths of the total area under cultivation in the East is now bearing:

ACREAGE UNDER CULTIVATION

	Acres	Percentage of Increase.
In bearing before 1915	900,000	
Increase in 1915	280,000	31 per cent.
" " 1916	420,000	35 " "
" " 1917	340,000	21 " "
" " 1918	220,000	11 " "
" " 1919	170,000	8 " "
" " 1920	120,000	5 " "
Total now in bearing	2,450,000	
Increase in 1921	180,000	7 " "
" " 1922	160,000	6 " "
" " 1923	160,000	6 " "
" " 1924	200,000	7 " "
Total planted	3,150,000	

In this connection, of course, it must be borne in mind that there is a wide difference between the terms "in bearing" and "in full bearing," and that it is the former which is applicable in this case.

Margin of Safety Provided

Absolute accuracy is not claimed by the firm in question for the above figures, but care has been taken to eliminate the risk of serious error, and it may be that the area planted has been over-stated rather than under-stated (we think this is quite likely.) A margin of safety is provided by the fact that considerable areas of the earliest plantings in the Malay States were so badly damaged in the early days of pioneeer tapping that re-planting of these areas is necessary. A large portion of the acreage owned by Chinese and native planters, too, has been so drastically tapped that its future yielding capacity will certainly be well below that of British owned properties. "The figures given may, therefore," continues the circular, "be regarded as a moderate statement of the position; and emphasis may fairly be laid on the important point that while the area of rubber that reached the bearing stage in the three war years 1915-16-17 alone increased the tappable acreage by over a million acres, the area to come into bearing in the next three years (1921-22-23) is less than half that total. The importance of this point may be seen by comparing the percentages of increase (shown in the right hand column above) for each of these two periods. These percentages have steadily fallen since 1916, and clearly prove the point that, after passing through a period in which large areas were annually coming into bearing, the industry is now entering upon a series of years during which the additions to the producing area will be relatively small."

The following table is given in the circular to show the increase in the shipments from the producing countries that has taken place in the last ten years:—

SHIPMENT FROM PRODUCING COUNTRIES, 1910-1919.

	Plantation. Tons	Wild. tons	Total. tons	Increase (+), or decrease (—). tons	ratio
1910	8,200	62,300	70,500	+900	+1 per cent.
1911	14,419	63,730	75,149	+4,649	+7 per cent.
1912	28,518	70,410	98,928	+23,779	+32 per cent.
1913	47,618	61,822	108,440	+9,512	+10 per cent.
1914	71,380	49,000	120,380	+11,940	+11 per cent.
1915	107,867	50,835	158,702	+38,322	+32 per cent.
1916	152,650	38,948	201,598	+42,896	+27 per cent.
1917	223,000	52,628	275,628	+74,030	+37 per cent.
1918	188,000	40,629	228,629	—47,000	Average increase 62,000 tons, say 22½ pct. per ann.
1919	358,000	41,635	399,635	+171,000	

In comment on this we are reminded that in 1918 (through the lack of freight) a large portion of the crop remained unshipped, and heavy accumulations of stocks—probably 50,000 tons above normal—took place in the East. The fact that the whole of these accumulations, as well as the largely increased 1919 crop, were absorbed in the following year leaves no doubt as to the strength of the world's demand for the commodity. During the past five years the production and consumption of rubber have increased at the average rate of about 50,000 tons per annum. Estimates of future production prepared by one of the highest authorities on the plantation industry are quoted to support the view that no such increases can be expected after 1920, viz:—

ESTIMATED FUTURE PRODUCTION

	Plantation. tons.	Wild. tons.	Total. tons.	Increase. tons.
1920	360,000	40,000	400,000	——
1921	381,000	40,000	421,000	21,000
1922	403,000	40,000	443,000	22,000
1923	43,000	40,000	470,000	27,000

Summarizing the position the circular draws the conclusion from the above statistics that for the next three years the increase in the world's production of rubber is not likely to exceed 6 per cent or 7 per cent per annum, while for the past five years the manufacturing demand has absorbed increases averaging more than 25 per cent per annum. "Even if during 1921-23 the rate of increasing demand should drop to five per cent per annum the world's output would be fully used up. If the rate increases at anything *more* than five per cent we must inevitably reach a period of actual shortage. For instance, supposing that the average increase of the last five years should be cut down to one-half (12½ per cent instead of 25 per cent per annum) we might by the end of 1921 be faced with a shortage of 30,000 tons of rubber, to be followed by another two years' increasing stringency. The effect of an approaching shortage will make itself felt in the market some time before the position actually arises, as far-sighted consumers of rubber will not quietly wait to be "caught short." In a word, in the absence of a set-back in the trade of the world there is practically no risk of rubber falling below its present price (exempt as a temporary fluctuation), while the chances of a rise are almost startling, in view of the statistical position revealed."

Some Criticism from Internal Evidence

We have ourselves, as our readers well know, always maintained a steady faith in the prospects of the plantation rubber industry, and in the ability of the consumers to absorb year after year largely increased quantities of rubber. This belief has so far been well justified, and we see no reason to revise it. In the estimate of the present position and prospects of the industry, from which we have just quoted, the point regarding the relatively small annual additions to the producing area which are now to be expected (5 per cent in 1920, 7 per cent in 1921, 6 per cent in 1922, etc) is well brought out. The assumption in the last paragraph, however, unless we are mistaken, is that production will increase in just the same degree as the area in bearing. This is taking a great deal for granted. The expert whose figures are given in the table of "estimated future production" certainly budgets for an almost exactly similar increase, but a comparison of the table of "shipments from producing countries, 1910—1919," with the table of acreage under cultivation and in bearing in the years 1914—1920 and 1921—1924 (estimated) will show that the percentage crop increase does not run parallel with the increased area brought into bearing. Another factor to be taken into account is the improvement in the yield per acre with the ageing of the trees.

We have worked out from the particulars given the yield per acre over the whole area in bearing from 1914 to 1919. It is as follows:—

1914 ..... 177 lb.	1916 ..... 213 lb.
1915 ..... 205 lb.	1917 ..... 256 lb.

For 1918 and 1919, taking the average shipments for the two years and the average acreage in bearing, and despite the restrictions in the former year, it was 286 lb. The less new acreage brought into the tapping round, the higher of course is the average yield per acre likely to climb, because there are fewer comparatively low yields from young trees to pull

India Rubber Journal, London, England.

it down. Applying these figures for a moment we see that in 1915 the percentage of increase in area in bearing was 31 and the percentage increase in "shipments" (for the purposes of argument say "production") was 32. Without further information this looks as if production did increase exactly as bearing acreage, but it is of course only a coincidence. Looking into the figures we find that the yield per acre rose from 177 lb. to 205 lb. (including the yield from the young areas, which pulled down the average). If we assume for the purposes of argument that the 280,000 acres newly brought into bearing in 1915 gave 100 lb. per acre, this would amount to 12,500 tons, meaning that of the total increase in plantation rubber production in this year (36,487 tons) nearly two-thirds was accreditable to the increased yield of areas already in bearing in former years.

Increase in Yielding Capacity

The increase in the yielding capacity of older areas is a factor too well known and too formidable to be ignored in the compilation of estimates. The firm responsible for the preparation of the circular to which we have been referring is also too well versed in plantation rubber matters to be capable of ignoring it. We can only imagine therefore that their estimate of 6 or 7 per cent increased production per annum (corresponding to the increased area brought into bearing) sets off against the increased production of older areas the known lower production per acre of the younger areas as they are brought into bearing, and the loss of productive capacity due to disease and bad cultivation, etc., on native and Chinese-owned estates . That these factors should balance each other is, however—if it has been made—another somewhat wide assumption.

The immediate effect of bringing into bearing a further 180,000 acres (a 7 per cent increase on the area at present in bearing) if we assume 300 lb. per acre from the area already in bearing and 100 lb. per acre from the new area in its first year of cropping, it would not be an increase of 7 per cent in production, but one of under 2½ per cent, i. e.:—

2,450,000 acres at 300 lb.	=	735,000,000 lb.	= 328,000 tons
180,000 acres at 100 lb.	=	18,000,000 lb.	= 8,000 tons
		753,000,000 lb.	= 336,000 tons

8,000 tons expressed as percentage of 328,000 tons = 2.38

A 7 per cent increase in production in the given year would therefore call for an increased yield of 4.62 per cent by the older areas on plantations. Or stating it in another way, a 2½ per cent yield increase on areas already in production would equal in immediate effect the bringing of 180,000 new acres into bearing. Between 1914 and 1918-1919, according to the above figures, yield per acre increased from 177 to 286 lb. per annum, or over 61 per cent.

Rubber Shortage a Possibility

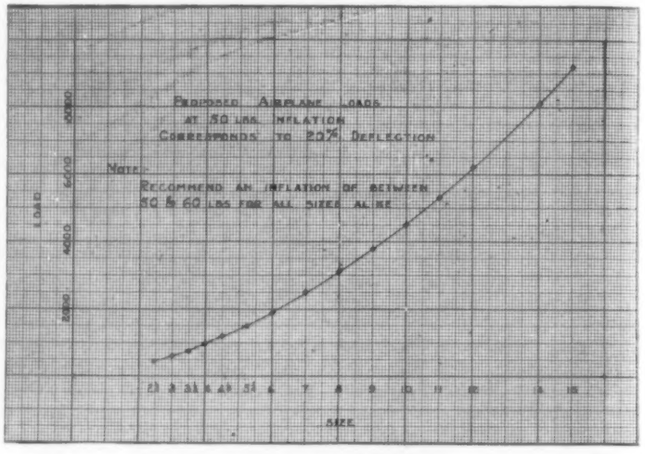
One cannot rise from the study of the circular without registering the conviction that the prospect of a rubber shortage is not as remote as the present low price of the commodity would lead the observer to expect. American consumption has lately been checked by various occurrences, and the trade in this country is much quieter, but these checks can only be of a temporary character. If the suggested 25 per cent annual increase in the U. S. A. requirements of rubber (or anything like it) materializes, where is the rubber to come from? Not from the new areas arriving at the bearing stage, for their capacity (acording to the figures) is not to be counted on for more than 2½ per cent annual crop increase. The only resource is the increased yielding capacity of older areas. To what will this amount? Another point which emerges clearly from any consideration of the subject is the great importance of the maintenance of adequate labor forces on the estates. More and more attention will have to be paid in the future to this factor in rubber production. According to Mr. Emerson at the recent annual meeting of the Malacca Plantations, there is forming a consensus of opinion in favor of the more general adoption of alternate day tapping as a solution of the labor difficulty. It is a solution which many estates are finding satisfactory from their point of view, but it is not so certain that it will be equally satisfactory in future to the consumer.

Loads for Airplane Tires

The Goodyear Tire & Rubber Company recommends the following loads for various sizes of airplane tires:

SIZE	PRESSURE	LOAD
26 x 3	50 to 60	600 lb.
26 x 4	20 to 60	1000 lb.
750 x 125	50 to 60	1500 lb.
800 x 150	50 to 60	1900 lb.
900 x 200	50 to 60	3100 lb.

The plot attached shows still other sizes from 2½ to 15 in.



LOADS FOR AIRPLANE TIRES

The loads are conservative and do not give high bearing pressures on the ground. They may be used therefore on landing fields which have fairly soft surfaces.

Determination of True Free Sulphur

(*Continued from page* 502)

Hence, the figure obtained for the combined sulphur after extraction with alcoholic potash is much more nearly correct than any obtained by methods which do not take into account the acetone-insoluble compounds of sulphur with resins and proteins. It is still possible that there is some sulphur combined with proteins and resins, insoluble in acetone and not attacked by alcoholic potash. For the present, therefore, the figure obtained by the method presented here must be considered as a maximum value for the coefficient of vulcanization.

These methods were applied to a series of cures on a stock made up of 100 parts of pale crepe and 5 parts of sulphur. The results are given in Table III as parts of sulphur per 100 of rubber:

TABLE III.

Cure Hrs.	True Free S	Sulphur in Alc.-KOH Extract	Coefficient of Vulcanization	Sulphur in Resin and S Compounds (Sol. in Acetone) (by Difference)
0.5	4.39	0.00	0.61	0.00
1.0	3.93	0.00	1.03	0.04
1.5	3.74	0.03	1,21	0.02
2.0	3.18	0.03	1.63	0.16
2.5	2.54	0.07	1.93	0.46
3.0	2,12	0.13	2,30	0.45
3.5	1.76	0.26	2.51	0.47
4.0	1.27	0.33	2.88	0.52
4.5	0.85	0.49	3.14	0.52
5.0	0.54	0.34	3.54	0.58

From these results it is evident that the theories of vulcanization proposed in the past, none of which took into account the formation of these compounds, are based on false figures and cannot be considered sufficiently accurate.

Two new methods for rubber analysis are presented. The first gives the correct value for free or elementary sulphur in rubber goods, and the second a lower and more accurate value for the coefficient of vulcanization than can be obtained by any of the older methods. This work was all done on pure gum stock without any accelerator, and the methods developed are now being expanded to meet the conditions which obtain in compounded stocks.

Rubber Division Meets in Chicago

Important and Well-Attended Gathering Held in Connection with Sixtieth Meeting of the American Chemical Society, September 8 and 9 -- Interesting Papers and Discussions Feature Sessions.

Nearly one hundred members of the Rubber Division of the American Chemical Society attended the third meeting of the division, which held in connection with the sixtieth meeting of the society, took place in Chicago on September 8 and 9. A number of interesting papers were read and these together with a number of important discussions featured the two days of the meeting. In addition to the foregoing officers were elected for the ensuing year. The sessions of the division were held at Kent Hall, of the University of Chicago.

The meeting was opened by Chairman W. K. Lewis following which Secretary Arnold H. Smith read a report relating to accelerators. He stated that following the discussion at the spring meeting in St. Louis he had given the announcement to the trade journals that the Rubber Division did not object to the proper use of trade names for accelerators. It did,however, most strenuously object to the marketing of unknown products which are sold under trade names and whose true constituents are supposed to be kept secret. This objection he stated was two-fold in that the division held that the advancement of the industry is retarded by the use of unknown materials and that the public frequently suffers as the result of the indiscreet use of unknown accelerators.

The Question of Accelerators

A general discussion then ensued as to the best means of ridding the market of bogus accelerators. A committee consisting of J. B. Tuttle,W. F. Zimmerli, C. W. Bedford and Arnold H. Smith was then appointed. This committee was instructed to card index all available information concerning the analysis of accelerators on the market and to keep this file complete as new accelerators appeared. The information in this file will be available to all members of the division.

Prof. H. E. Simmons reported that the committee on physical testing was endeavoring to obtain specifications for the physical testing of rubber which would be satisfactory to all of the various interested societies and organizations.

Considerable discussion then ensued regarding the policy of the division regarding any publication. All were agreed that the members desired longer and more complete abstracts of rubber articles than now appear in "Chemical Abstracts." Various methods were discussed, such as an intercompany publication or some arrangement with one of the rubber journals whereby abstracts might be prepared by the division and published in this journal. A committee was appointed consisting of W. W. Evans, R. E. Hall and C. W. Bedford to investigate more thoroughly what might be accomplished along either line. Any action taken as a divisional activity must be approved by the council of the society as a whole.

There were two papers presented by the Research Laboratories of the New Jersey Zinc Co. H. A. Depew delivered these. In the first, "*The Ageing of Some Rubber Compounds*" giving the comparative results on some accelerated ageing tests on zinc oxide stocks as compared with some carbon black stocks. Considerable checking and cracking was observed on the surface of the stocks, the zinc oxide stock showing up by far the more favorable of the two. It was pointed out by Olin C. North that the high percentage of hexamethylenetetramine would cause very bad ageing and might be held accountable for some of the bad ageing of the black stock.

In the other paper "*Some Microsections Cut from Vulcanized Rubber Articles*" Mr. Depew gave an interesting description of the difficulties encountered in making microphotographs of rubber articles and told of the methods with which they had had the best success. He had prepared slides from a good many sections which proved exceedingly instructive when thrown on the screen.

"*The Action of Heat and Light on Vulcanized Rubber*" by J. B. Tuttle stated that the action of heat and light on vulcanized rubber is often spoken of as being identical and that oxidation is often said to be the cause of the deterioration. From published and unpublished tests it is shown that the action of heat is one of change in the rate of chemical reaction between rubber and sulphur and goes on throughout the entire mass, whereas the action of light is one of exidation taking place on the surface. Heat produces no change in the solubility of the rubber substance in solvents such as acetone and alcohol whereas light breaks up the rubber molecule forming decomposition products which are readily soluble in acetone.

"*The Action of Certain Organic Accelerators in the Vulcanization of Rubber, II*" by G. D. Kratz, A. H. Flower and B. J. Shapiro also proved interesting. The activities of certain synthetic, nitrogenous organic accelerators, in a mixture of rubber and sulphur, were compared with the dissociation constants of the original substances. With the exception of members of a closely related series, no definite relation was found to exist between the activities of the substances as accelerators and their dissociation constants. Substances which decompose, or react, with other components of the mixture to form substances of acid character do not accelerate unless a neutralizing base, or salt, is present. The results obtained, and the conclusions drawn from them, compare favorably with other results obtained with ammonium salts.

This was followed by "*The Action of Certain Organic Accelerators in the Vulcanization of Rubber. III*" by the same authors.

In this paper the relative activities of molecularly equivalent amounts of aniline and diphenylthiourea in the acceleration of vulcanization were compared in rubber-sulphur mixtures and in mixtures which contained zinc oxide. In a rubber-sulphur mixture, the activity of aniline was found to be much greater than that of diphenylthiourea. In mixtures which contained zinc oxide, the reverse was true. With aniline as the accelerator, either in the presence or absence of zinc oxide, the same maximum tensile strength was obtained, accompanied by a higher sulphur coefficient in the absence of zinc oxide than when this substance was present. The mixtures which contained zinc oxide, attained the same maximum tensile strengths at approximately the same sulphur coefficients, irrespective of whether aniline or diphenylthiourea was employed as the accelerator. It is evident that there is apparently no general relation between the physical properties and sulphur coefficients of accelerated mixtures.

Information Service Advocated

A contribution from the United States Rubber Co., general laboratories, "*The Organization of an Information Service in Connection with Industrial Research Organizations*" by R. P. Rose and J. H. Reel was among the papers read. This contended that the expansion of industrial research justifies a study of its organization and its relation to the parent corporation. It is developed that about two per cent of the total turnover of a corporation may profitably be spent for development, and that about two per cent of this development fund may be applied to information service.

This department should have as large a library as is justified, and, through weekly bulletins and mongraphs, should keep the workers informed of the progress of knowledge as developed in the literature and from experimental work. All the information available should be indexed in such a way that it may be readily searched. It seems desirable that this department should edit technical reports, in order that the relation between new work and old may be brought out. This department should be able to prepare reports which are intelligible to business executives.

The technical details of the establishment and operation of such a division were discussed.

"*A Theory of Vulcanization Based on the Formation of Poly-Sulphides During Vulcanization*" by Winfield Scott and

C. W. Bedford held that all organic accelerators and a number of inorganic accelerators function as catalysts of vulcanization through the formation of polysulphides. These accelerators may be placed into two classes:

1. Hydrogen sulphide polysulphide accelerators. Organic bases are believed to form polysulphides by the aid of hydrogen sulphide. Examples are piperidene and dimethylamine which form polysulphides in the presence of hydrogen sulphide and sulphur. Inorganic bases such as sodium hydroxide, calcium hydrate, magnesium oxide and basic magnesium carbonate function in the same manner as the above.

2. Carbo-sulph-hydrol polysulphide accelerators. Thio ureas and dithiocarbamates are believed to form some type of polysulphides through the grouping of *C-SH*.

Differentiated from the above two classes of accelerators are such accelerators as zinc oxide and litharge which do not form polysulphides. These are termed "secondary accelerators" owing to the fact that they decompose polysulphides to give active sulphur.

Peachey's Method Discussed

The round table discussion concerned itself largely with the method of vulcanization recently proposed by S. J. Peachey. Samples were shown of various types of rubber goods at which vulcanization was attempted by the new process. The discussion brought out the following points:

Scientifically the method is correct; the action of hydrogen-sulphide and sulphur dioxide in the rubber reacting to produce active sulphur which in turn vulcanizes the rubber almost instantaneously at ordinary temperatures. This vulcanization then allows of the use of many dyes in the rubber goods which will not stand the present ordinary conditions of manufacture.

The reaction between hydrogen sulphide and sulphur dioxide does not produce all active sulphur however—a considerable portion of sulphur being formed. Extraction of goods cured by this process will oftentimes show more uncombined than combined sulphur and the free sulphur content is ordinarily as high as in goods cured in the ordinary way.

The practical operation of the method is the unsurmountable difficulty to the process. The degree of vulcanization must be regulated by a very careful measure of the quantity of gases absorbed, the production of a uniform state of vulcanization through an article of appreciable thickness being impossible.

Because of the impossibility of obtaining a uniform state of vulcanization and because of the difficulty of controlling the quantity of the different gases, the American chemists have not grown enthusiastic over the process as have our English brothers.

W. B. Wiegand talked on *"Rubber Energy"*. He brought out many interesting facts concerning the relations between energy storage capacity of rubber compounds, their hysteresis losses and other physical properties as brought about by the introduction of different fillers into the compound. Slides showed the particle size of ordinary compounding ingredients and the properties they imparted to the rubber were shown by stress-strain curves. A very interesting discussion regarding the relation of physical properties of our compounds to both solid tire and pneumatic tire design was given. In all an excellent paper.

The symposium on rubber analysis was intended primarily to review the work that had been done and to correlate it with any work that might be attempted by the division. W. W. Evans had prepared a compilation of the literature on rubber analysis which is undoubtedly as complete as anything published. Not only are the references given but comprehensive abstracts are included. The members of the division received these before the meeting so that they could be reviewed.

Discussions on various determinations were led largely by men who had been active in developing or improving these determinations. The various direct methods for the determination of rubber were discussed and then the methods for the determination of the various extracts, free and total sulphur, fillers, etc. The point seemed to be brought out very clearly that since compounded rubber goods contain almost anything under the sun, the production of a uniform analytical procedure for the analysis of all goods was out of question. After all, the big part of rubber analysis is not to get the analytical results, but to properly interpret the figures obtained, taking into consideration the methods that were employed.

The division decided that it would not undertake any work on analysis for the time being.

Election of Officers

The election of officers for the ensuing year resulted as follows: Chairman, W. W. Evans, B. F. Goodrich Co.; Vice-chairman, C. W. Sanderson, Fisk Rubber Co.; Secretary, Arnold H. Smith, Goodyear Tire & Rubber Co.; Executive Committee: G. D. Kratz, J. B. Tuttle, C. W. Bedford, J. R. MacGregor and H. E. Simmons.

The Growth of the Rubber Industry in Japan

The following interesting commentary upon the growth of the rubber business in Japan appeared recently in The India Rubber Journal, London, England: The article states as follows:

The remarkable prosperity of Japan during the war is revealed in a report on the commercial, industrial and financial situation of that country by the Commercial Secretary to the British Embassy at Tokio, which has recently been issued. Although Japan participated in the great war on the side of Great Britain and her Allies, her unique position, remote from the central theaters of hostilities, safeguarded her from the dangers and damages of war and created for her vast commercial, economic and industrial opportunities, of which, generally speaking, she took full advantage.

It will be remembered, however, that Japan this year has been in the throes of an economic crisis, which had its origin in excessive speculation and brought about many commercial failures. As the result of this financial depression much of Japan's wartime gain was lost. The present trading prospects are, however, bright, and, as is pointed out in the report under review, given a sane financial policy Japan should be able to retain the high position to which she has attained in recent years.

In common with practically every other trade in the country, the Japanese rubber industry has made remarkable progress as a result of the war. The war not only enabled Japanese manufacturers to increase their home trade, but also enabled them to consolidate their foreign trading positions, particularly in such countries as India, China, Java, etc. The development of the rubber industry has caused a constant increase in Japan's rubber imports, especially from the Straits. During 1919 the imports totalled 18,099,629 kin (1 kin = 1.32 lb. avoir.) whereas in the year 1917, the import amounted to little more than a third of this total. As their consumption of rubber grew, Japanese manufacturers and merchants engaged in the industry naturally endeavored to gain more control of the raw product, and as a consequence Japanese vested interests in rubber plantations in the Straits, Borneo and the Philipine Islands have extended remarkably during recent years. The section of the rubber trade which has benefitted mostly from the war is perhaps the tire industry. Before the year 1914, large numbers of tires of all description were shipped into Japan, but, although a small number of American motor car tires are still imported, the import of these goods is very small indeed at the present time. The export trade, however, is in a totally different position, it having grown enormously since the war. In 1918 the tire exports amounted to two and a half million kin, whereas in the following year no less than 3,606,000 kin were exported to various parts of the world.

Types of Tires and Tubes in Use Abroad

The following article compiled by the Merchants Association of New York from data furnished by American consuls should prove of interest to tire and tube manufacturers who contemplate entering the export field.

During the latter part of December, 1919, The Merchants' Association of New York addressed requests for information to a large number of American Consuls on behalf of members who desired data regarding the kinds of inner tubes in use in the various countries. The replies to these requests have been coming in for a number of months. The questions were as follows:

(1). The general types of cars in use, i. e., trucks, pleasure cars, including heavy touring cars or light roadsters.
(2). Sizes and kinds of inner tubes commonly in use.
(3). Countries from which the inner tubes are imported.
(4). Any peculiarity of construction in automobile shoes necessitating special makes of inner tubes.

The questions and answers are listed below according to continents and countries.

Question 1—Types of Cars in Use

The types of cars and trucks in use were reported by the consuls representing seventy-five cities and districts. This information was sent, of course, as of secondary importance and as explanatory of the more important questions in the inquiry i. e., those relating to the types of inner tubes and tires in demand.

On the whole, it would appear that throughout the European countries cars of all weights and classes are in use, as is true in the United States. Light cars were sometimes mentioned as in use in hilly or mountainous parts of the continent. Trucks of five or six ton capacity are apparently not in common use; light trucks ranging from one and a half to four ton capacity being referred to more often. Industrial and commercial centers frequently spoke of the growing use of trucks in supplanting other classes of vehicles.

In Mexico, Central and South America, all types of cars were mentioned in the larger and better established cities, but on the whole it appears that light cars and trucks are far more popular than the heavier builds. In fact, except for a few of the more popular or progressive centers, trucks were seldom mentioned in replies from this part of the world. The use of light vehicles is claimed to be due to the fact that the roads are often in such poor condition as to make it impossible to use other types of cars. Special mention was made of the growing use of trucks on the Cuban sugar plantations.

The use of light cars in the Orient, including India, China and Japan particularly, was stated to be due to the fact that the streets are not adapted for heavy and cumbersome vehicles, both because of their construction and because of the fact that they are often narrow and winding in their character.

In Oceanica, on the other hand, many of the cities of which are undoubtedly patterned after English and American standards, the use of all classes of cars is referred to.

Question 2—Sizes and Kinds of Inner Tubes Commonly in Use

It is impossible to summarize, to any degree, the data regarding inner tubes, and it is, therefore, presented in detail. It is interesting to note that the standard classes, brands and sizes of inner tubes and tires have been reported to us as being in use in the following cities: Ghent, Copenhagen, Paris, London, Edinburgh, Glasgow, Bergen, Christiania, Helsingfors, Madrid, Goteborg, Buenous Aires, Bahia and Para, Antofagasta, Barranquilla, Guayaquil, La Guaira, Georgetown, San Jose, Guatemala City, Santo Domingo, Kingston, Port-au-Prince, Cienfuegos and Havana, Guadalajara and Nogales, Sonora, Alexandria, Teneriffe, Hankow and Hongkong, Bombay and Madras, Kobe and Yokohama, Penang and Singapore, Sourabaya.

BELGIUM

It has been recently reported by the American Consul at Brussels that although no special tubes are necessary because of the construction of automobile shoes, all tubes should be equipped with European valves, which differ from the standard American valve.

Brussels: Metric measurements are used practically exclusively in quoting tire sizes. Probably not more than two or three per cent of the automobiles used in Brussels are equipped for standard American inch tires.

The following are the usual metric sizes used in quoting tires:

DIMENSIONS MILLIMETERS

Sections	Diameters	Sections	Diameters
65	650		765
			815
	700		
85		105	875
	750		
			915
	710		820
	760	120	880
90			
	810		920
			1020
	870		
	910		835
		135	
			895
			935

Liege: The sizes of tubes most commonly in use are: 820 x 120 centimeters; 820 x 135 centimeters; 815 x 105 centimeters; 765 x 105 centimeters.

FRANCE

Information from the American Consul at Bordeaux indicates that although American manufacturers turn out both soft-bead and straight-side tires, the French manufacture only the soft-bead or clincher tires. Each of these requires a special rim and in corresponding dimensions. A car with wheels fitted for straight-side tires cannot be fitted for tires of French make. A new set of rims is required which would be adapted for French clincher tires, as indicated in the following table.

Bordeaux: The sizes and kinds of inner tubes commonly in use correspond

FRENCH CLINCHER TIRES AND CORRESPONDING AMERICAN DIMENSIONS

28 x 3	760 x 90	34 x 4	875 x 105
30 x 3	810 x 90	32 x 4½	895 x 135
30 x 3½	765 x 105	34 x 4½	880 x 120
34 x 3½	875 x 105	35 x 5	880 x 120
36 x 3½	915 x 105	34 x 4½	935 x 135
30 x 4	765 x 105	35 x 5	935 x 135
32 x 4	815 x 105	36 x 4½	920 x 120
36 x 4	915 x 105	37 x 5	920 x 120

Lyons: The sizes of tires for runabouts, touring cars and limousines are given below in centimeters.

Runabouts	Tires Limousines	Touring Cars
cm.	cm.	cm.
650 x 65	850 x 120	765 x 105
710 x 90	880 x 120	815 x 105
760 x 90	920 x 120	875 x 105
810 x 90	835 x 135	820 x 105
	895 x 135	
	935 x 135	

Marseilles: The inner tubes in greatest demand are those suitable for the

710 x 90 mm.	(27.56 x 3.54 in.)
815 x 105 mm.	(32.09 x 4.13 in.)
820 x 120 mm.	(32.28 x 4.72 in.)

GREAT BRITAIN

Dublin: The most popular tires are beaded-edge, non-skid and steel studded rubber of the following sizes:

700 x 80 mm.	820 x 120 mm.
760 x 90 mm.	880 x 128 mm.
810 x 90 mm.	895 x 135 mm.
815 x 105 mm.	935 x 135 mm.

GREECE

Salonica: The sizes of tires commonly in use are: 30 x 3 inches, for light cars; 30 x 3½ inches for light cars; 35 x 5 inches for heavy cars.

HOLLAND

Amsterdam: The inner tubes commonly in use are:

815 x 105 mm.	895 x 135 mm.
820 x 120 mm.	935 x 135 mm.
765 x 105 mm.	880 x 120 mm.

ITALY

Milan: The diameter of the inner tubes is as follows: 710, 765, 820, 920, 935, 760, 815, 850, 835, 810, 875, 880, 895 for very light cars inner tubes of 650, 700 and 750 are being used.

Rome: The tires range from 30 x 3½ to 37½ x 5½.

NORWAY

The American Consul at Bergen states that the roads in Norway are of hard rock. The paving, where it exists at all, is ordinarily granite blocks or cobblestones. The grades are steep, and strong and durable tires are required.

Stavanger: Clincher tires of the following sizes are used:

34 x 4½ inches	32 x 4 inches
33 x 4½ inches	30 x 3½ inches
32 x 4½ inches	

PORTUGAL

Lisbon: The tubes commonly used are:

760 x 90 mm.	880 x 120 mm.
815 x 105 mm.	875 x 135 mm.
820 x 120 mm.	935 x 135 mm.

Oporto: Trucks of heavy type use solid tires. Similar sizes of inner tubes and tires are used as in the United States.

RUSSIA

Vladivostok: All makes of inner tubes are seen, but the following are the most common: 920 x 120 mm., 880 x 120 mm.

SWEDEN

It has been reported by the American Consul at Malmo that single solid tires are generally in use, although a few pneumatics are on the market. Front tires are generally plain cord, while the rear tires are anti-skid cord.

Malmo: The front and rear tires are respectively for a 1½ ton truck—36 x 3½, and 36 x 5 inches for a 2 ton truck; 36 x 4 and 2 x 36 x 4 inches for a 3½ ton truck; 36 x 5 and 2 x 36 x 5 for a 5 ton truck. The automobile tires commonly in use are of the following sizes: 32 x 4 inches; 33 x 4 inches: 33 x 4½ inches; 34 x 4½ inches.

Stockholm: The sizes of inner tubes most commonly in use are 4 inches in diameter with a tire of 32 inches. There are, however, a number of 4½ inch inner tubes used in conjunction with 34 inch tires.

SWITZERLAND

Basel: The best quality of inner tubes are used, having the following sizes:

760 x 90 mm.	835 x 135 mm.
815 x 105 mm.	880 x 120 mm.
820 x 120 mm.	935 x 135 mm.

Geneva: The common sizes of inner tubes in use are:

760 x 90	765 x 105
810 x 90	815 x 105
820 x 120	850 x 120

Zurich: The common sizes of tubes and tires in demand are: 800 x 120; 765 x 105; 875 x 135; 920 x 120.

TURKEY

Constantinople: The sizes of inner tubes commonly in use are: 815 x 120 mm.; 880 x 120 mm.; 935 x 135 mm.

SOUTH AMERICA

The American Consul at Antofagasta stated that most of the automobiles coming from the United States are equipped with rims adapted to clincher tires, and some complaint is made that tire manufacturers seem to persist in sending straight-side tires, which cannot be used on the cars there. No specific type of rim is used other than that mentioned above.

Rosario, Argentina: The best selling tire is about 31 inches x 3¾ inches. Strength and wearing qualities are necessary as the country roads are poorly kept.

Porte Alege, Brazil: The dimensions of tires in common use are: 30 x 3 and 30 x 3½.

Santos, Brazil: The common sizes of inner tubes in use are 36 x 4½, 33 x 4, 32 x 4, 30 x 3 and 30 x 3½.

Ascunscion, Paraguay: Practically all inner tubes and tires the sizes of which are 30 x 3 in. and 30 x 3½ in. are seen in this city. Because of the bad condition of the streets, which are paved with rough, sharp cobblestones, the tires and inner tubes should be of the strongest kind.

Callao-Lima, Peru: The sizes and kinds of inner tubes commonly in use are: 34 x 4 inches; 34 x 4½ inches; 35 x 4½ inches.

CENTRAL AMERICA

Colon, Panama and Panama, Panama: Inner tubes are of the following sizes: 30 x 3; 30 x 3½; 33 x 4; 34 x 4.

WEST INDIES

Barbados, British West Indies: Inner tubes are of the following sizes.

30 x 3	clincher covers
30 x 3½	clincher covers
31 x 4	clincher covers
32 x 3½	clincher covers and S. S. covers
32 x 4	clincher covers and S. S. covers
33 x 4	clincher covers and S. S. covers
34 x 4	clincher covers and S. S. covers
34 x 4½	clincher covers and S. S. covers

MEXICO

Chihuahua: Inner tubes are of the following sizes: 30 x 3; 30 x 3½; 33 x 4; 34 x 4; 35 x 4½.

Vera Cruz: The inner tubes correspond to tires of the following sizes: 3 x 30; 4 x 31, 4½ x 35; 4 x 32.

AFRICA

The soft-bead or clincher tire with the straight side is coming in slowly, according to information received from the American Consul at Cape Town and Durban, Natal, South Africa.

The American Consul at Johannesburg, South Africa, has stated that beaded-edge millimeter size tire equipments are used. The term "beaded edge" is synonymous with that of clincher, which is so commonly used in the United States.

Cape Town and Durban, Natal, South Africa: The tires are of the following sizes: 32 x 3½; 31 x 4; 32 x 4; 33 x 4; 34 x 4; 33 x 4½; 34 x 4½.

Johanesburg, South Africa: The tubes used in this city are of the following sizes:

700 x 80 mm.	815 x 120 mm.
760 x 90 mm.	820 x 120 mm.
810 x 90 mm.	880 x 120 mm.
765 x 105 mm.	920 x 120 mm.
815 x 105 mm.	880 x 135 mm.
875 x 105 mm.	

ASIA

Shanghai, China: Pneumatic tires, double kind, 36 x 2 inches or 900 x 50 centimeters are used here; smaller and medium size for lighter cars and larger for heavier cars.

OCEANICA

Beaded-edge tires are most frequently in use, according to data received from the American Consul at Melbourne, Australia.

The American Consul at Sydney, Australia, stated that all the tubes manufactured locally are constructed on the laminated principle; that is, they are built up on layer upon layer of stock.

Auckland, New Zealand: The standard sizes of tires and tubes, and practically all grades are in demand, with the better qualities in the lead.

Melbourne, Australia: The sizes of tires are measured in millimeters and are as follows:

700 x 85	810 x 100	820 x 120
710 x 90	810 x 105	850 x 135
760 x 90	910 x 105	880 x 120
760 x 105	815 x 105	920 x 120
810 x 90	845 x 120	950 x 135

(Continued on Page 510)

The Preservation of Vulcanized Rubber

By Henry P. Stevens

Some time ago I was informed that vulcanized rubber kept in a tin box over a layer of ordinary kerosene remains in a serviceable condition for a much longer period than if kept in air. I therefore determined to test the preservative effect of kerosene and other vapors. The results confirmed the claim made for kerosene vapor and also showed that water vapor has a similar or even more marked effect.

For the experiments I used various vulcanized mixings to hand, consisting of plantation crepe or smoked sheet (90 parts) and sulphur (10 parts). I had previously investigated the effect of ageing in air on vulcanized rubber rings of this composition, so that I was in a good position to note the effect of ageing under varying conditions.

Kerosene Vapor a Preservative

Preliminary tests having shown that kerosene vapor had a marked preservative effect, experiments were made with a number of rings kept in small dessicators over kerosene in a dark cupboard. The controls were placed in an empty dessicator to protect them from laboratory fumes. The experiment was extended to include some rings placed in moist air with a layer of water instead of kerosene at the bottom of the dessicator, and other rings in dry air over calcium chloride. Rings were cut from two vulcanized rubbers, *A* and *B*; *A* with a coefficient of 3.02, that is to say, cured to give a reasonably long life under ordinary conditions and likely to improve on keeping for a few months, and B with a coefficient of 4.50 —that is to say, over-cured and likely to show an appreciable deterioration in a few months.

Rings from both rubbers serving as controls were also tested at the commencement of the ageing period (6½ months).

	Aged specimens, tested 19/11/18, preserved in				
Sample	(1) Controls, tested 27/3/18.	(2) laboratory air.	(3) air saturated with moisture.	(4) dry air.	(5) over kerosene.
A. Breaking strain, g. per sq. mm.....	1420	1540	1670	1360	1670
Final length: original = 1.....	10.69	9.77	9.79	9.34	10.30
B. Breaking strain, g. per sq. mm.....	1740	1430	1600	180	1525
Final length: original = 1.....	9.51	8.33	8.71	2.79	9.11

The specimens kept over kerosene were swollen and were therefore hung in air before testing. They still retained a little petroleum when tested, which probably accounts for the rather high figures for final length as compared with the remaining specimens.

The figures demonstrate the preservative action of water and kerosene vapors, both of which appear to be effective. With sample *A* improvement results with ageing; with sample *B* there is some falling off in breaking strain, but it is small. Dry air gives the lowest figures, and in sample *B* the rubber is perished. Laboratory air contains some moisture and the figures are consequently intermediate between dry air and air saturated with moisture. The contrast between the supple rings aged over moist air or kerosene and the harsh feel of those aged in dry air is very striking.

The preservative effect of moisture in the air is a matter of great interest and not previously remarked on or demonstrated.* It is quite common to find rubber goods stored in a dry place, whereas a damp, cool cellar would be preferable. The results also have a bearing on physical tests made on vulcanized rubber in the East. I have already shown that temperature is an important factor in ageing (Jnl. Soc. Chem. Ind., 1918, 281 T), and have suggested that the test rings should be kept in an incubator at the average temperature of the tropics during the period between vulcanizing and testing, so as to enable tests to be made in Europe to correspond with conditons in the tropics. It now appears that the atmosphere surrounding the test pieces in the incubator should be kept moist. Similar considerations apply to the so-called "accelerated ageing test," in which the specimens are heated in an oven to a temperature not exceeding 70 deg. C. The results will differ from similar tests in a moist atmosphere or ageing tests at room temperature.

Further experiments were made in which the rings were suspended in stoppered bottles placed in an incubator at 30 deg. C. to bring the temperature nearer that in the tropics. An attempt was made to substitute low-boiling petroleum for kerosene, as the vapor of the latter contains relatively high-boiling constituents which are difficult to remove from the rubber when once absorbed. Unfortunately, the more volatile petroleum vapor escaped from the stoppered bottle in a week or two at the elevated temperature. To remove the high-boiling constituents from the rubber the rings were soaked in low-boiling petroleum and air-dried before testing. The specimen of rubber taken was over-cured, having a coefficient of vulcanization = 4.79.

		Aged specimens tested 2/7/19.	
Sample.	Control tested 3/1/19.	in air saturated with moisture.	in kerosene vapor.
Breaking strain, g. per sq. mm.....	1650	1330	840
Final length: original = 1.....	9.89	8.45	9.08

In this experiment, air saturated with moisture appears to have a greater preservative action than the kerosene vapor. As, however, the more volatile constituents of the kerosene vaporize and escape during the first few weeks of the treatment, the air in the later stages of the experiment will not be so fully charged with kerosene vapor as at the commencement. The kerosene-preserved rings were soft and supple although weak and partly perished. The kerosene vapors absorbed appear to counteract the harsh feel of rubber perished in the air. The soft and supple feel of kerosene-preserved rubber is not therefore to be taken as indicating that perishing has not taken place.

Ageing Shows Small Increase in Coefficient

When vulcanized rubber ages only a small increase is shown in the coefficient, provided the rubber is not considerably over-cured.† It was of interest to ascertain whether this increase is influened by the medium surrounding the specimen. As one could not be certain of removing the remains of petroleum from the specimens preserved over kerosene, all specimens were weighed both before and after acetone extraction, and the coefficient calculated on the weight of both the original and extracted rubbers. In the figures below the percentage loss on acetone extraction is also given. The vulcanized rubbers used were both appreciably over-cured, with coefficients $C = 5.53$ and $D = 5.48$. The rings were hung in bottles as before in an incubator at 30 deg. C. The air in one bottle was kept dry by sticks of caustic potash.

It is probable that the deterioration in kerosene vapor resulted, as before, from the loss of the volatile constituents.

* Since the above was written I have been informed that rubber stoppers have been preserved in water for 30 years. Although the action may be the same, immersion in water is not so generally applicable to rubber goods as preservation in a moist atmosphere.

† The present communication was written before the publication of Eaton and Day's paper entitled "Ageing experiments on vulcanized plantation rubber." These authors have also noted the increase in combined sulphur which takes place on ageing, and are apparently under the impression that they were the first to show definitely that such increase takes place. This, however, was already a well-ascertained fact (*cf.* Hinrichsen, Koll. Zeits., 1911, 8, 245; Spence, Koll. Zeits., 1912, 10, 290, and 1912, 11, 28; Van Rossem, Netherland Govt. Inst. Comm., Pt. 6, p. 219, as well as numerous determinations of my own, J., 1918, 305-306T and 340-342T, in the latter of which a correlation between the value of the coefficient and the amount of increase during ageing under uniform conditions is revealed). Eaton and Day also refer to the formation in one case of a volatile "sulphide." I had previously noted the formation of a volatile sulphur compound in all cases where a thoroughly perished acetone-extracted rubber was kept in a dry atmosphere, and I gave some account of its reactions and properties which are being further examined.

From the Journal of the Society of Chemical Industry.

	Control tested 12/12/18. (1)		Aged specimens, tested 2/7/19. (2) Dry Air.		(3) Air-saturated with moisture.		(4) Kerosene.	
	C.	D.	C.	D.	C.	D.	C.	D.
Breaking strain, g. per sq. mm.	1540	1610	Quite perished	Quite perished	1950	1600	Too weak to give a figure	60
Final length: original = 1	9.21	9.08			8.60	8.90	2.34	4.18
Coefficient calc. on weight before extraction	5.53	5.48	6.92	6.38	5.38	5.20	5.20	4.71
Do., on weight after extraction	—	—	7.49	6.85	5.41	5.24	6.13	5.27
Loss on acetone extraction, per cent.	—	—	10.5	10.6	5.60	5.9	8.8	15.3

The loss on extraction of the moist air samples (3) only slightly exceeded the free sulphur, so that practically nothing but free sulphur and so-called resinous matter present in the original rubber was extracted by the acetone. On the other hand, both of the dry-air perished samples (2) lost about 10½ per cent., which, after subtraction of the free sulphur, leaves 7—8 per cent of vulcanized rubber extracted and dissolved out by the acetone.

In a previous paper (Jnl. Soc. Chem. Ind., 1919, 194r) I showed that vulcanized rubber gradually becomes more soluble in benzene the more it is perished; eventually it becomes soluble in acetone also. As part of the perished vulcanized rubber specimens *C* and *D* under (2) dissolves in acetone, together with the sulphur with which it is combined, it follows that the coefficient, if calculated in the usual manner on the original weight, will be too low, and the correct figure will be a higher one, obtained by basing the calculation on the weight of the specimen after acetone extraction .This increase in the coefficient amounts to about ½ per cent in the above examples. The following figures were obtained by analyzing a number of specimens vulcanized to varying degrees, weighing the rubber buth before and after acetone extration.

The figures in the last column show that newly vulcanized rubber yields about 3 per cent of acetone extract in addition to the free sulphur, whatever the coefficient may be, but that, after perishing, the extract may attain any figure. It may be concluded that previous published figures for the combined sulphur or coefficient of rubber after ageing, including my own, are too low for those specimens which were perished.

Coefficient calc. on weight before acetone extraction.	Coefficient calc. on weight after acetone extraction.	Loss by acetone extraction, per cent. by wt.	Free sulphur extracted (by difference), per cent.	Matter extracted other than free sulphur per cent.
Specimens in good condition analyzed shortly after vulcanization.				
1.31	1.37	12.3	8.8	3.5
1.39	1.45	12.6	8.8	3.8
1.40	1.45	11.6	8.7	2.9
1.44	1.51	12.2	8.7	3.5
1.78	1.84	11.5	8.4	3.1
3.07	3.17	10.0	7.2	3.1
3.41	3.60	10.1	6.9	3.2
4.23	4.38	9.2	6.2	3.0
4.59	4.75	8.8	5.9	2.9
5.58	5.74	7.7	5.0	2.7
6.44	6.70	7.6	4.2	3.4
7.28	7.54	6.7	3.5	3.4
Specimens analyzed when aged for varying periods and perished.				
5.43	12.60	56.3	5.1	51.2
6.37	9.32	32.7	4.3	28.4
6.38	6.85	10.6	4.3	6.3
6.92	7.49	10.5	3.8	6.7
7.29	9.04	20.8	3.7	17.1

From the results, particularly the constancy of the acetone extracts after ageing, it appears that the preservative action of water or kerosene vapor is due to an actual chemical preservation of the vulcanized rubber. These agencies inhibit or retard the chemical changes, including oxidation of the rubber, which normally take place when vulcanized rubber is aged in air, as shown by increase in weight and increase in acetone extract, but they do not retard the physical changes sometimes known as "after-vulcanization," as shown by the tensile strength and reduction of distensibility (reduced final strength) of the rings kept in air saturated with water vapor. We may therefore distinguish two changes which normally take place when vulcanized rubber ages:— Firstly, a physical change comprising an initial increase in tensile strength (if the specimen is not appreciably over-cured), and a gradual reduction in final length.

Secondly, a chemical deterioration, consisting mainly in an oxidation with a slight loss of sulphur in a volatile form. The extent of the chemical change is conditioned (1) by the coefficient of vulcanization, the higher the coefficient the more rapid the oxidation, (2) by the atmosphere surrounding the specimen, and (3) by the temperature. I do not propose at this stage to put forward a theory to account for the preservative action of the water vapor, as further experiments to this end are in progress.

Conclusions

1. The life of vulcanized rubber is prolonged by storing in air saturated with moisture or petroleum vapor. Even over-cured rubber can be preserved by this means for six seven months at tropical temperatures.

2. Preserved under these conditions, the acetone extract does not increase, showing that the rubber is protected from oxidation and decomposition. Nevertheless, the physical changes characteristic of "after-vulcanization" proceed normally.

3. In dry air the chemical change (oxidation)takes place more rapidly than in air containing moisture, and an increase in the acetone extract takes place.

4. As the oxidation of soft vulcanized rubber takes place the more rapidly the higher the coefficient, and is accompanied by an increase in the coefficient, and as vulcanized rubber, when perished tends to become soluble in acetone, the percentage of combined sulphur or coefficient in such cases should be based on the weight of the specimen after acetone extraction.

A New Peachy Invention

This invention relates to the vulcanization of rubber in solution by sulphur without the aid of heat.

The addition of a small quantity of nitroso-benzene (C_6H_5NO) or of a similarly constituted nitroso-hydrocarbon of the cyclic series to a solution of rubber in benzene, naptha, carbon disulphide, or other suitable solvent, mixed with sulphur induces a fairly rapid vulcanization of the dissolved rubber, even in the cold, that is to say, at the ordinary atmospheric temperature. The occurrence of vulcanization in the solution is readily observed in that the solution sets to a jelly which on drying yields a product insoluble in the solvents which dissolve unvulcanized rubber.

The following example serves to illustrate the process:—

10 grms. of rubber and 1 grm. of sulphur are dissolved in 150 grms. of carbon disulphide. 0.6 grm. of nitroso-benzene is now added, and the solution is well shaken. On standing for about thirty minutes the solution sets to a jelly, which by evaporation of the solvent yields a mass of vulcanized jelly.

British Patent No. 146,734 to S. J. Peachey, Lecturer in Chemistry, 5, Yew Tree Road, Davenport, Stockport, England.

Tires and Tubes in Use Abroad

(Continued from Page 508)

Sydney, Australia: Approximately thirty per cent of the inner tubes are of the following size: 30 x 3½. Fifteen per cent are of the following sizes: 815 x 105, 875 x 105. The other sizes are, in the order of their importance: 880 x 120; 33 x 4; 920 x 120; 32 x 3½.

Question 3—Countries Which Produce Inner Tubes and from Which They Are Imported by Other Countries.

The three countries reported as supplying inner tubes for automobiles and trucks all over the world are the United States, Great Britain and France. It is said that Italy makes her own tires and sends a quantity to Switzerland. Otherwise the three countries mentioned are the source of supply.

Question 4—Any Peculiarity of Construction in Automobile Shoes Necessitating Special Makes of Inner Tubes.

As indicated in reports received from American Consuls in foreign countries, it would seem that there is no peculiarity in the construction of automobile shoes which would necessitate special makes of inner tubes in any of the countries from which replies have been received.

Export Possibilities for Rubber Manufacturers

Recent numbers of "Commerce Reports," issued by the Department of Foreign and Domestic Commerce of the Department of Commerce, Washington, D. C., have contained an abundance of interesting data relative to the exporting of American rubber goods to foreign countries. This information is largely in the form of consular reports from consulates in Canada, Mexico and Switzerland.

In addition to the foregoing the August 16 issue of "Trade and Commerce" containing Canadian consular reports contains an interesting account of the market for tires and tubes in Holland. The reports are as follows:

Canada

Consul General Frederick M. Ryder, Vancouver, British Columbia.

There is only one firm in the district interested in the manufacture of rubber goods, and is situated at Coquitlam, British Columbia. It has a fully equipped plant and intends to commence operations September 1. The rubber already purchased by this company is reported to have been imported from South America and India, and the firm has received orders aggregating $1,000,000 in value, largely for shipment to New Zealand. While principally interested in the manufacture of automobile tires, certain side lines will also be marketed.

Rubber Tires and Boots and Shoes

Consul Charles M. Freeman, Halifax, Nova Scotia

There are no manufacturers of rubber goods in the Halifax consular district, and, as far as can be ascertained, no raw, scrap, waste, or reclaimed rubber is imported for manufacture. The market for rubber tires in Nova Scotia, while there are some 12,000 automobiles and trucks, is good, even better than for the same number of machines in the United States, as the poorer roads call for more frequent replacements. The tires used and sold here are almost wholly of Canadian manufacture.

The sizes most generally used are the 30 by 3½ inches. All tires of this size sold here are of the clincher type. Other sizes are the straight wall or straight side type. Terms of payment are twenty-five per cent off for cash, net thirty days.

The market for rubber boots and shoes, on account of climatic conditions and such industries as the fisheries and lumbering, is most excellent. This class of goods has, in the past, been obtained from two sources, American and Canadian, but the present tendency, on account of unfavorable exchange, is to place all possible orders with Canadian manufacturers. Rubber boots and shoes are ordered from traveling salesmen, or purchased direct. No statistics of imports or exports are available, but it is known that at present very few rubber boots or shoes are imported . The terms of payment usually given are thirty days, with two per cent discount for cash.

There is also an excellent market for belting, and a fair market for other rubber goods used for industrial purposes. Credit is given by the manufacturers for thirty or sixty days depending on the size of the order and the credit standing of the purchaser. The larger industrial plants buy direct from the manufacturer.

Sizes of Tires in Demand in the Kingston District

Consul Felix S. S. Johnson, Kingston, Ontario

In the Kingston district in 1920 there will be a great demand for automobile tires. The prosperity enjoyed by the farmers during the past five years enables them to have a car or two. The cheap car is the one in greatest demand, finding a ready sale, and in consequence thereof the demand for small-sized tires is large. Sizes in demand are 30 by 3½ inches, 31 by 4 inches, 32 by 4 inches, 34 by 4½ inches, 35 by 5 inches, and 37 by 5 inches. Clincher 30 by 3½ inches and 31 by 4 inches are most popular, while the straight side comes next.

Over two-thirds of the tires sold in this district are made in Canada and those of American make are sold through distributing houses in Toronto. Terms of payment are cash thirty days, varying from two to five per cent.

The demand for rubber boots and shoes is in the spring and fall of the year. Shipments are made to the retail trade in July and August and payments met in November, when a discount of 2½ per cent is allowed. Owing to the duty and the unfavorable exchange American goods are practically shut out of the Canadian market, the only source of supply being Canadian goods. The rubber boots sold are in the following sizes: Men's, 6 to 11; boys', 1 to 5; youths', 11 to 13; and childrens' 6 to 10½. Heavy rubber shoes find a sale only in the agricultural sections of the district.

Certain Lines of Goods That Must Be Imported

Consul Bertil M. Rasmusen, Moncton, New Brunswick

The centers for the rubber industry in Canada are Montreal and Quebec. Adverse exchange conditions have practically closed the market to rubber goods from the United States, but there are many lines of goods that must be imported because Canadian manufacturers are not so far advanced in the making of insulated rubber, scientific apparatus, and miscellaneous rubber goods included under druggists' sundries, but the list is narrowing down and may before long exclude these also.

The market for rubber tires is considerable. Fully over 50 per cent of the tires sold in this district are of the 30 by 3½ inch size for small cars and runabouts. For the larger cars the size of tires ranges from 32 by 4 inches to 35 by 5 inches, fabric and cord, straight side for large cars, and clincher for the smaller cars. The usual terms are thirty days and two per cent for cash.

It is the general opinion among dealers in rubber clothing particularly coats, of American manufacture is superior to the domestic article, and that there will be a demand for this class of goods in spite of the added cost on account of duty and adverse exchange. There is a stable market here for American-made rubber packing and fruit-jar rings, because of superiority.

How the Rubber-Goods Trade Is Handled

Vice Consul Harold G. Tewell, Winnipeg, Manitoba

No rubber goods of any description are manufactured in the province of Manitoba, the source of supply for this product being the rubber-manufacturing centers of eastern Canada and the United States. The bulk of the tire business consists of Canadian manufactured goods from Ontario factories operated by both American and British capital. Factory branches and warehouses are maintained in Winnipeg by the manufacturers, these branches in turn handling the retail and jobbing trade. These branches maintain their own systems of accounting and selling organizations, and a stock of tires sufficient to supply the demands of the territory is received direct from the eastern factories. The provinces of Manitoba, Saskatchewan, and Alberta are included in the territory controlled by the branches at Winnipeg, as a rule, jobbers, being found in the larger cities. Terms of payment generally quoted to retail dealers are two per cent on the tenth of the following month, or thirty days, net, with the same terms to jobbers, who, in addition, receive a jobber's discount.

The retail price in Manitoba of a Canadian-made automobile tire is approximately twenty per cent higher than the retail price in the United States of an American-made tire of equal quality. However, imported American tires are subject to an import duty of thirty-five per cent, a two per cent sales tax recently imposed, and an adverse rate of exchange. A number of well-known American-made tires are on the market, selling for about forty-five per cent higher than in the United States. However, due to increased cost of production, all Canadian tires advanced in price about twenty per cent during the last year.

The most popular sizes in general use are the 30 by 3½ inch clincher and the 32 by 4 inch straight side tire, the first-named size comprising about sixty per cent of the number of tires sold. In conformity with the action of the American Rubber Association, the Canadian manufacturers will at once reduce the number of odd and oversize tires now being made and concentrate on three or four standard sizes. The tire market in the Province is reported to be very good, but factory branches say there is no unprecedented growth in the volume of sales.

Demand for Rubber Footwear

The rubber boot and shoe trade in this province is locally controlled. There was a time when American rubber footwear found a market here, due to distinction and variety of style, but the improvement of Canadian manufacturers has resulted in swinging the trade balance. In some lines of footwear Canadian products excel American manufacturers in points of workmanship and finish. The market for rubber footwear in this locality is said to be unlimited, some factories being unable to meet the demands of trade, and an ever-increasing demand is expected, particularly for overshoes and rubbers, as many residents of the British Isles now coming to Canada, unused to rubber footwear, will follow the custom of the country, as have thousands of laboring classes from central Europe.

Rubber goods for industrial purposes are manufactured in eastern Canada and distributed by factory branches and sales managers in Manitoba. Terms of payment are similar to those given jobbers in other rubber lines, and the market is reported as being good. A very small quantity of industrial rubber is imported.

It is estimated that about one-third of the druggists' sundries made of rubber is imported from the United States. This class of goods includes hot-water bags, air cushions and mattresses, bathing caps, toys, and some surgical bandages. Rubber cement and elastic are also received from the United States.

Mexico

The only competition offered recently to American automobile exporters has been through the manufacture of tires by two factories in Mexico City. This local product is placed on the market at prices twenty-five per cent lower than the prices of the tires imported from the United States. On account of a shortage of raw materials (chiefly of American origin) the output of the Mexican tire factories is small and at times negligible. These plants have been unable as yet to perfect their processes of manufacture, and their product is not so uniform as that of the American standard tire manufacturer. The Mexican-made tire has not, therefore, been a serious factor in competition.

Undoubtedly the best market in Mexico for motor vehicles is Mexico City, where the 1919 registration showed a total of 2,337 private passenger cars, 1,916 pleasure cars for hire, 1,104 jitney busses, and 136 motor trucks, making a total of 5,493 cars in the city. There are few good streets or roads in that vicinity at the present time, however, on which motor cars can be used. At one time there were five excellent roads running out from Mexico City to neighboring towns, but these roads have not been kept in repair. A total of sixty-eight miles of fairly good road is found between the capital and the suburbs of Xochimilco, Desierto de los Leones, Tlalpam, San Angel, Tacubaya, Atzcapotzalco, and Guadalupe.

Plans for road construction reported by the Secretary of Communications in 1919 included a project for connecting Mexico City with Tuxpam, in the State of Vera Cruz, and others for uniting Queretaro with Tampico, Chilpanzingo with Acapulco, Linares with Galeana, and Chignahuapan with Furbero.

Switzerland

Trade Commissioner H. Lawrence Groves, Zurich

During the past twelve months there has been an unusual influx of passenger automobiles, trucks, and motor cycles into Switzerland, due to various causes, with the result that the number of motor vehicles in use in the country is estimated to be 20,000 passenger automobiles, 6,500 trucks, and 5,000 motor cycles. These figures are based on actual registration records for a majority of the cantons and on estimates from automobile-tire dealers who follow the market closely. A great many of the machines that have come into Switzerland since the armistice are used machines that have been purchased in France, Italy and Germany. There has been an important increase in imports of new American cars. Apparently none, or practically none, of the American used military cars have come into Switzerland.

Road conditions in Switzerland favor the use of motor vehicles. Practically all public roads in common use are of macadam or concrete structure and are maintained in excellent condition. This network of fine roads covers the entire country, which, of course, is hilly to mountainous throughout. There are certain restrictions on the operation of motor vehicles, notably in the Canton Grisons in the high mountain section in the southeastern part of the country, in which are located a number of the country's well-known pleasure resorts, such as St. Moritz, Davos and Arosa; in this canton general motor vehicles are not allowed. Certain minor restrictions are in force in other cantons forbidding the use of automobiles during specified hours on Sunday.

Makes of Tires in Swiss Market

At the present time there is no lack of automobile tires in the Swiss market. Aside from American tires, the following brands are being offered: Michelin; Prielli, Milan; Dunlop; Bergougnan; Clincher, North British Rubber Co., Edinburgh; Soli, French; Continental; and Harburg-Vienna. Current retail cash prices as furnished by a Zurich firm for a high-grade American tire, plain tread, which it handles are (millimeter = 0.03937 inch; par of exchange of Swiss franc = $0.193): 700 by 85 millimeters, 98 francs; 710 by 90 millimeters, 124 francs; 910 by 90 millimeters, 154 francs; 710 by 100 millimeters, 166 francs; 910 by 100 millimeters, 214 francs; 765 by 105 millimeters, 195 francs; 915 by 105 millimeters, 229 francs; 820 by 120 millimeters, 254 francs; 920 by 120 millimeters, 285 francs; 895 by 135 millimeters, 358 francs; and 935 by 135 millimeters, 374 francs. The retail prices on the competing tires mentioned average about twenty per cent less. Retail agents receive a commission of ten per cent.

No pneumatic tires are made in Switzerland. During the war a Swiss company did some manufacturing of airplane tires at the Government's suggestion, but this is said to have been discontinued. Solid-rubber tires for trucks are made in a rather small way by a firm at Pfaeffikon. They are being used to a considerable extent by three Swiss concerns on the trucks they manufacture.

Sales Handled Through Garages

The Swiss trade is well organized for handling the tire business, which is done largely through garages. There is no house, either retail or wholesale, that handles these goods exclusively, as the trade is not large enough to justify it. The people of the country respond well to advertising very much along American lines; and this is true in French Switzerland, as well as in the German part to the north. The jobbing centers are Zurich, Basel and Geneva, in the order or their importance. The Swiss tariff on tires is eight francs per 100 kilos (220.46 pounds) gross weight.

The cost of gasoline is somewhat of a handicap to the development of the automobile trade at present; the price, which is no longer subject to Government control, is now about 1.20 francs per liter (0.264 gallon) retail. It has been reliably reported that the Swiss Government has arranged for considerable imporations of gasoline.

Imports of Automobile Tires

The imports into Switzerland under article 522 of the Swiss tariff, in which automobile tires are classed and which is entitled "tubes and pipes of caoutchouc and gutta-percha pure or mixed, with internal layers of metal or tissues," for the year 1919 were as follows (kilo = 2.2046 pounds):

Countries of origin.	Quantity. *Kilos.*	Value. *Francs.*
Austria-Hungary	1,900	23,327
France	486,100	5,976,069
Italy	133,900	1,957,330
Belgium	2,000	24,684
Great Britain	116,800	1,442,939
United States	43,700	631,705
All other countries	800	13,329
Germany	21,000	222,393
Total, 1919	806,200	10,291,776
Total, 1918	207,600	1,859,877

Exports under this classification were negligible. While figures for the imports of automobile tires alone are not available, it is believed that they made up the great bulk of the amounts given in the above table.

Holland

Trade Commissioner A. Stuart Bleakney

Following is the report from "Trade and Commerce" regarding the market for tires and tubes in Holland:

The import market for tires and inner tubes depends of course largely on the number of automobiles in use and the extent to which the local industry can supply the demand. It is also affected by the nature of the Dutch brick roads, which are hard on tires.

The automobile is having a great boom in Holland in spite of the fact that there are several factors which have acted in the past as a discouragement. First, in regard to pleasure autos, there is the smallness of the country, which is covered with a network of steam railways, electric trains and steam trams, which carry passengers at a low rate. Secondly, in regard to motor trucks, there is always the competition of canal traffic, which is extraordinarily cheap, efficient and ubiquitous. In the cities the prevalence of innumerable push-carts operated by man power, assisted by dogs, and the flatness of the country, results in the absorption of much freight which might otherwise be carried by trucks.

In spite of these apparent discouraging factors the present year shows a considerable increase in the number of automobiles and trucks imported, and it is commonly remarked here that the number of automobiles and trucks has increased amazingly since the armistice. In December, 1919, the cars imported averaged per month 444. In January, 1920, they numbered 925, in February 900, in March 810, in April 617, and in May 865.

There are four factories in Holland producing tires. In 1918 the export of tires from Holland was nil. In 1919 it was only 8,704. From January to May only 2,994—figures which are practically negligible. It is evident that there is a growing demand for tires to refit the Dutch importations of cars.

The manager of the tire department of probably the largest importing house in Holland states: "There is at the present moment quite a boom in the tire trade. The number of automobiles and motor trucks is increasing day by day. Quality is the main requirement for tires in this market. The car owner in Holland is as a rule well-to-do and owns a high-class machine for which he demands and can pay for a good tire."

This firm do not sell their tires, which are a well known American make, on a mileage basis, but some of their competitors do. Before the war tires were usually sold with a guarantee clause for so many kilometers. Steel studded tires are only used here to a small extent, about one car in five using them. Importers usually handle one tire exclusively. They allow twenty-five per cent on pneumatics to retailers and twenty per cent on solid tires. Retail prices for solid tires include the pressing on of the tire.

In regard to motor trucks, solid tires are used for heavy traffic and pneumatics for the lighter and faster traffic. The above firm stated that a shipment of 4,000 to 5,000 tires was the size of shipment they considered the most desirable. Two months from receipt of order is considered a first-class delivery. At the present time shipments take about six months from the United States, and this is a great handicap to business.

The following figures give Dutch importations of tires and inner tubes for 1919 and five months of 1920:—

MANUFACTURES OF RUBBER

	January, 1919, to December.		January, 1920, to May.	
Automobile Tires.	Gross weight. Kilogrammes.	Value. Gulden.	Gross weight. Kilogrammes.	Value. Gulden.
1. Outer Tires—				
Great Britain ...	278,916	1,900,652	33,682	179,123
United States ...	363,703	2,064,602	268,661	1,688,067
France	81,005	570,015	31,971	250,451
Other countries..	32,200	262,894	47,824	305,005
Total	755,824	4,798,163	382,138	2,422,646
Outer Tires—	Number.		Number.	
Great Britain ...	31,060	.....	2,582	—
United States ...	27,501	.....	21,671	—
France	8,015	.....	3,059	—
Other countries..	3,184	.....	4,393	—
Total	69,760	.....	31,705	—
2. Inner Tires.	Kilogrammes.	Value. Gulden.	Kilogrammes.	Value. Gulden.
Great Britain ...	51,191	376,744	3,986	15,517
United States ...	45,495	238,027	43,890	157,691
France	19,466	130,949	1,723	12,569
Germany	.....	.....	3,237	19,437
Belgium	.....	.....	4,710	30,233
Other countries .	3,510	29,023	673	3,960
Total	119,662	774,743	58,219	239,407
Inner Tires—	Number.		Number.	
Great Britain ...	23,888	.....	1,333	—
United States ...	18,408	.....	13,851	—
France	8,772	.....	769	—
Germany	.....	.....	1,029	—
Belgium	.....	.....	2,095	—
Other countries .	1,969	.....	322	—
Total	53,037	.....	19,399	—

Future Rubber Research

By Andrew H. King

For some time rubber research has been almost entirely in the hands of the chemists. In some respects the progress has been very satisfactory. But since chemical specialists have predominated, the present status of the industry may be described as lopsided. There are now many pressing problems which are essentially of a physical or a mechanical nature. Without detracting in the least from the good work of the rubber chemists, the writer wishes to point out a few of these problems.

Rubber testing is beyond question in most serious need for scientific attention. The methods in vogue today were largely forced on the manufacturers of hose, belting and other mechanical goods by the consumers for their own protection. Naturally these methods were not devised for the scientific exploration of the properties of a compound, but only enough data were desired to show that one article corresponded in value to one previously furnished. It is to the everlasting disgrace of these manufacturers who when compelled to go one mile with the consumers refused to go with them the Biblical twain. However, since it was formerly so easy to jumble a number of materials together and produce sort of a grab-bag product just good enough to get by, this condition can be easily explained if not fully understood. The writer has seen old formulas for hose, tubes, etc., which contained as many as twenty different mineral fillers and half a dozen different rubbers.

Five years ago almost the only criterion for comparing the relative values of compounds was tensile strength. Ultimate elongation was considered, but usually as of secondary importance. Recently an attempt has been made to measure the residuum of plasticity present in all stocks. The Davies-North method of determining permanent set may not be the last word—undoubtedly is not—but it is at least a step in the right direction. This is the quality the old line compounder measured with his fingers because his testing machine would not show it to him.

Wiegand at St. Louis last April emphasized very strongly the importance of stress-strain curves. It has been recognized for years that Hook's law does not apply to rubber. The ratio of stress to strain is itself a variable. The area under the stress-strain curve may be measured with a planimeter and from it the energy expended in stretching the test piece may be calculated.

Wiegand obtains his stress-strain curves with a Scott machine and two observers. It is a rather expensive method, but there is no testing machine which will serve. For that matter, the makers of testing machines have been more energetic in selling their product than in developing it to fit the needs of the industry. For example:

(*a*) All American machines are built to apply load to the piece at a rate of 20 in. per minute. Now it happens that a constant rate of elongation is not nearly as desirable as uniform increment of load. Machines should be built to give so many pounds per sq. in. increment per minute.

(*b*) The charting devices on all American machines plot increased load against jaw separation, which because of slippage is variable and has no bearing on the properties of the stock. The design of a good charting device depends largely on getting the proper grips, which unfortunately do not exist today.

In Europe the Schopper machine, which requires ring test pieces, is in use. American factories have declined to use

Chemical and Metallurgical Engineering

this machine because of the difficulties of obtaining proper test pieces and the fact that due to unequal inner and outer circumferences the stress is not applied evenly and consequently the piece fails by tearing. However, it seems to me that we have been straining at a gnat and swallowing a camel.

In the matter of hysteresis, which is of maximum importance, there is no machine available except the Schwartz. This is, however, too light for high tensile strength compounds and has not the proper grips for straight test pieces. It is also unsuitable because of the method of applying the load. It seems remarkable that no one has yet published a description of a good hysteresis machine. Hysteresis is probably a measure of internal friction, a property which is now giving the solid tire men some worry.

Hardness is another quality as yet not satisfactorily measured. Some of the difficulty is in the matter of definition, but one machine which purports to measure it by deformation has so much friction in its bearings, etc., as to render all results worthless.

For resistance to abrasion we are also without satisfactory methods of measurement. Only makeshift apparatus designed after the grindstone are available.

Resistance to repeated stretching and to tearing are also important. The makers of testing machines are not yet aware of it.

Then there is the question of an accelerated age test. There are no methods which are quite satisfactory. For that matter, how much do we know about the ageing of rubber and rubber articles? For my part I am willing to admit that in many cases I have no idea what causes it or how to stop it, let alone how to measure it.

It is my firm conviction that if we can catalog and evaluate the properties of rubber the designing of compounds for special purposes will be rendered much easier and surer than it is today.

In order to understand these phenomena better optical or other methods which will show us exactly how the particles of filler are contained by the rubber and something as to the structure of the rubber itself are quite necessary. Schipple's volume increase with elongation may be one way. Metallographic methods ought to be of great value.

One could go on indefinitely pointing out work that should be done, but since space is limted this must be taken up later.

Compounding

Compounding was once the mystic art of the rubber industry. It is becoming, and rightly so, much less secretive. Some day American rubber men will understand that our national reputation hinges on all American products being absolutely satisfactory. The ceramic industry, which was formerly in the same boat with rubber, realizes this fact and co-operation is the watchword now.

However, we cannot get very far with a study of compounding until the physicist gives us better and more accurate methods of testing. Also compounding experiments should not be carried on solely from the physical standpoint. The information regarding the change in coefficient of vulcanization must be obtained simultaneously. It is remarkable how few rubber companies keep an accurate check on free and combined sulphur in their compounds. The steel companies are forced to maintain large routine laboratories for sulphur, manganese, fixed and graphitic carbon, etc. Sulphur plays the same part in rubber as carbon does in steel, yet we are indifferent to its variation. This is in most cases due not to the compounder but to a stingy policy of the directors, who may be excellent men but are ignorant of the fundamental reaction of their industry.

North's paper on compounding ingredients which was read at St. Louis last April was a good beginning. Other rubber laboratories should contribute their bit and soon we would begin to have some valuable fundamental information which is lacking at present.

In accelerators I believe we have enough for the present. Let us thoroughly investigate the few which we now know to be of value before going into this subject much deeper.

Fabric

Cotton fabrics are employed throughout the rubber industry. Yet how much do we know about them? For example, fabric must be held in place by rivets of rubber which are forced between the threads. It is almost impossible to make rubber stick to cotton threads. Why?

The internal friction of the fabric in a tire generates a large amount of heat. How can this be cut down or eliminated? Cord tires heat up less, but even they are not entirely satisfactory in this respect.

There are any number of problems directly bearing on the rubber industry which are not being worked on, at least they have not been described.

Design

In matters of design we are not exactly in a sound position. In tires nothing essentially new has come out for a long time.

A question which has never been satisfactorily answered is that of the stresses in these articles. The writer is of the opinion that in general the tires, etc., just happened to be put together and no special study of the forces encountered was made. In other words many tires, etc., are poorly designed and fail not because of the materials but because of the design.

The supply of gutta percha for ocean cable is diminishing rapidly. A substance which will replace it will be very acceptable.

The fiber sole is now in general use. They must be cheapened and a method for rendering them slightly porous must be worked out. Leather is decreasing in supply and not only soles of rubber but tops of rubber and fabric are needed.

Continuous Processes

There is still too much intermittent hand work in the rubber factories. Machines for hose- and tire-building are in use, but the steps are far from being continuous. There are many other instances. For example, hose, tires, etc., are vulcanized in large heaters with steam. When the proper time has expired the steam is blown off and the heater cooled so it can be opened. Just consider the quantity of heat absolutely wasted. With coal at $8 or more a ton this cannot go on. Continuous processes of vulcanizing must be worked out.

Temperature Control

Temperature control, because of the extensive use of organic accelerators, is very important. Unfortunately too many companies depend on poor thermometers, which are rarely if ever checked up. Presses are particularly bad because they do not as a rule give the same temperature between all decks. The temperatures of mills and calenders are still judged by hand. Surely instruments can be developed for their direct measurement.

The rate of heat flow through fabricated articles such as a dredging sleeve, a pneumatic truck tire or a solid tire is of maximum importance in designing the stocks which are to be used. Unless this is carefully studied the surface is likely to be overvulcanized while the center will be porous or undercured. Very few accurate scientific data are available on this subject.

Conclusion

The writer has not attempted to go into detail on any one phase of the problems mentioned above. But surely there are so many big problems to be attacked that laboratories not employing physicists should engage a good one at once.

It should be unnecessary to point out that the British rubber factories are getting together and have organized a strictly British Rubber Research Laboratory under the management of the well-informed and able Dr. Twiss. The war has taught them the advantage of co-operation. But has this lesson been learned by American firms? Their men have helped in the work of the Rubber Section of the American Chemical Society, but the "powers that be" in certain of the older firms are "agin it." The English have been slow in many respects in rubber, but if they really pull together we may expect some strenuous competition and should be organized accordingly.

Surely the jealousy and antipathy which defeated the plan for an extensive co-operative rubber library in Akron a few years ago must be effectively killed. Is it not possible that a study of the physics of rubber and of rubber products, a study which is so broad that no one firm can hope to handle it alone, may not be the basis for that co-operation which we all desire but from which so many are held back for fear the other fellow will not come through with what they want to know after they have answered his question?

National Exposition of Chemical Industries

Grand Central Palace, New York, Scene of the Sixth Annual Exposition. Previous Records for Attendance and Number of Exhibits Surpassed.

The sixth National Exposition of Chemical Industries which was held in the Grand Central Palace, New York City, during the week of September 20-25 was without doubt the most successful exhibition of chemical and allied products to be held in the history of the chemical industry. That the fifth exposition which took place a year ago in Chicago was an epoch-making event was universally acknowledged at the time but it was the consensus of opinion among the visitors that the recent display was in a class by itself.

Whereas a year ago the total number of exhibitors was in the neighborhood of 350 the Sixth National Exposition of Chemical Industries saw the products of 460 exhibitors on display. These not only occupied the main floor of the Grand Central Palace but filled the mezzanine floor and the third and fourth floors of the building as well.

The arrangement of exhibits was a distinct improvement over anything which had ever been seen and elicited much favorable comment on the part of the visitors. Displays of raw materials, finished products, machinery apparatus and the thousand and one things which enter into the life of the chemical industry were to be found on all sides and consequently there were but few of those in attendance who could not find something of much more than passing interest.

In addition to the exposition a number of organizations held meetings throughout the week. Dinners, luncheons and trips to places of interest featured the week while a number of symposiums were held during the six days. These symposiums included the subjects of fuel economy, industrial management, materials handling, chemical engineering and ceramics.

The Exhibits

The exhibit of the General Chemical Co., New York, was of a varied and interesting nature. Among the articles shown was a perfect working model of a 70 ton sulphuric acid tank car. This car had been built on a scale of 1¼ inches to a foot and was a perfect model of the tank car designed by the company, which is said to be the first 70 ton tank car for the carrying of sulphuric acid. In addition to this there was a working model of the new Herreshoff furnace and a 1200 pound section of a mold of ammonia alum made at the company's plant at Laurel Hill, N. Y. The display was in charge of J. M. Keating, W. W. Freystedt and T. N. Powell.

Eimer & Amend, New York, showed replaceable unit electric furnaces and hot plates; Freas electric ovens; Hortvet cryoscope; Juerst ebullioscope; Bingham & Green viscometer and plastometer; McMichael viscosimeter; U. S. Navy type emulsifier; Barnstead water still; Wysor polishing and grinding apparatus; Braun pulverizer; Morgan drop weight apparatus; American rotary vacuum pump; MacLeod gage, Columbia University type; Kobe condenser; Fleming and Fisher combustion bulbs; Hortvet butter fat bottle; refractometers, microscopes and Duboseq colorimeters. C. G. Amend, W. R. Eimer, F. Wilbur Schulenberger, Theodore Taistra, I. Banner and Herman Weber were in charge.

The Buffalo Foundry & Machine Co., Buffalo, N. Y., occupied an entire cross section of the main floor of the Grand Central Palace. The space occupied by the company was handsomely decorated and served as a handsome background for an extensive display of vacuum dryers, evaporators, autoclaves, sugar apparatus and various chemical apparatus. Sales Manager E. G. Rippel was in charge of the display.

The J. P. Devine Co., Buffalo, N. Y., features a complete installation of a vacuum double drum dryer, used principally for drying liquids to powder form. This installation also included a condenser and a vacuum pump. H. C. Mills, advertising manager; L. W. Graves, sales manager, and H. W. How, engineer, were in attendance at the exhibit.

Paul O. Abbe, Inc., New York, featured a display of physical division machinery consisting of pebble mills, ball mills, mead mills and rubber rotary cutters. Paul O. Abbe was in charge of the exhibit.

The F. J. Stokes Machine Co., of Philadelphia, Pa., had an interesting display in charge of C. F. Coleman, sales manager, and L. H. Bailey, chemical engineer. The exhibit included vacuum dryers, vacuum stills, a surface condenser, powder filling machines, water stills and a tablet compressing machine in operation.

The Sherwin-Williams Co., New York, maintained an extensive display of aniline dye intermediates and the dyes themselves, featuring dry colors and fur dyes were also shown as was an accelerator of interest to the rubber trade-formaniline, a combination of formaldehyde and aniline oil. A. W. Steudel, Eastern manager of the dye, chemical and color department; J. O. Hasson, manager of industrial consumers sales; Dr. N. E. Van Stone, superintendent of the dye manufacturing department, and L. D. Walker, New York City representative, were in attendance in the booth.

New Jersey Zinc Co. Exhibit

The New Jersey Zinc Co., New York, displayed its products in an extremely unique and interesting fashion upon what was known as a "flow sheet." This consisted of a glass covered table which ran along the entire front of the booth. At one end of this table were the ores from which the various products of the company were derived; from these ores radiated a number of lines each of which indicated a different use for a zinc product. At the end of each line was placed the finished product in the manufacture of which zinc had been used. Thus at the end of the line marked rubber, appeared rubber tires, tubes, shoes, gloves, bathing caps and tubing. In addition to the foregoing a number of the company's finished products in the form of zinc dust, metals, pigments, chemicals and rolled zinc were upon display. An interesting adjunct to the exhibit was an example of the adaptability of zinc as a roofing material. The booth was in charge of W. Homer Hendricks, general sales engineer, and S. T. Ballinger.

The Sturtevant Mill Co., Boston, Mass., showed a model of the company's ring roll pulverizer, and open door steel elevator and an open door swing sledge mill. L. H. Sturtevant was in charge and was assisted by H. H. Tomlinson and W. T. Doyle.

The Foote Mineral Co., Philadelphia, Pa., exhibited rare and unusual ores and elements. The display featured zirkite and zirkite blocks and showed the refractory properties of zirkite and zirkonalba in an electric furnace and also showed the effect of zirkonium products used as crucible coatings. Vice-president H. C. Meyer and Samuel K. Bell were in charge.

Display of National Aniline and Chemical Co.

The National Aniline & Chemical Co., Inc., New York, maintained an extensive and interesting exhibit. This display was divided into three sections. On the left and right appeared mural paintings showing the chemical and dye-making plants of the firm at Buffalo, N. Y., and Marcus Hook, Pa. In front of these paintings were arranged pyramids showing in globular glass bottles the products of the factories, on the one side the coal-tar intermediates, and on the other the finished dyestuffs. The central section of the exhibit showed the veranda of a summer home. A party of life-size wax models attired in costumes occupied the porch. Every article of clothing worn by the models, all draperies, furniture, beverages upon the table—all derived their color from "National" dyes. Dr. J. Matos and H. Gardner McKerrow, advertising manager, were the firm's representatives at this exhibit.

The American Hard Rubber Co., New York, displayed a variety of chemical equipment including pipe and fittings, hard rubber centrifugal pumps, tanks, containers and various utensils. A. M. Ackerman and D. Wilkins represented the firms interests.

The Philadelphia Drying Machine Co., Philadelphia, Pa., showed a tray dryer and truck dryer as well as a number of chemical and clay products. B. P. Webster and C. H. Reumann handled the exhibit.

The Bristol Co., Waterbury, Conn., exhibited a new strip chart recording pyrometer, automatic compensator for cold end temperatures and a complete line of recording instruments. H. L. Griggs, general sales manager, and Charles W. Williamson, New York district manager, handled the exhibit.

The Foxboro Company, Inc., Foxboro, Mass., exhibited temperature controllers, recording thermometers, recording gauges, a recently-developed combination type recording thermometer and temperature controller and a new type recording thermometer for the rubber trade with a range of from 310 degrees to 330 degrees. Walter W. Patrick, E. P. Grout and L. D. Dupaul were in charge.

C. J. Taglinbue Mfg. Co., Brooklyn, N. Y., showed a time, temperature and condensation controller, a time controller uesd in connection with a perfect controller, and a number of other controllers, recorders and gauges. T. Dougherty, V. Wichum, A. R. Anderson, W. W .White, O. E. Mason and D. E. Carbonaro were at the booth.

E. I. DuPont de Nemours & Co., Wilmington, Del., maintained a fourfold exhibit. A display of acids and heavy chemicals was in charge of P. S. Tilden; pulp colors and dry colors were taken care of by S. R. Woodbridge; pyroxlin products were under the care of J. J. Moosman, while dyestuff intermediates and pharmaceutical chemicals were in charge of S. B. Poucher.

Taylor Instrument Co. Exhibit

The Taylor Instrument Co., Rochester, N. Y., maintained a display of industrial instruments used in the processes of chemical and other manufacturing industries. Among these were indicating and recording thermometers, indicating and recording electrical pyrometers, pressure, temperature and time controlling devices, laboratory thermometers and hydrometers. F. K. Taylor was in charge and was assisted by E. N. Hurburt, E. C. Taylor, A. J. Wagner, T. C. Hazard, W. N. Maurer, F. E. Ely, J. Gilmore and H. Kugler.

Whitall, Tatum & Co., New York, showed an exhibit consisting of crude rubber and rubber used in connection with chemical apparatus in the process of manufacture. In addition to this a complete line of "Nonsal" chemical glassware was shown. W. W. Figgis, New York sales manager was in charge.

The Gordon Dryer Co., New York, exhibited standard tray and truck type compartment dryers used for drying rubber as well as chemicals, colors, dyestuffs, pharmaceutical and medicinal products. The exhibit was in charge of Sales Manager Nathan Owitz, R. R. James and J. D. Stein.

W. L. Fleisher., New York City, exhibited an air conditioner and spray dryer in addition to which samples of dried materials were shown. W. L. Fleisher, president of the firm, A. W. Lissauer, vice-president, and D. L. Connelly, manager of the spray dryer department were in attendance.

The Luzerne Rubber Co., Trenton, N. J., exhibited a general line of hard rubber pipe, buckets, etc., designed for chemical purposes, battery jars, auto accessories, and articles for electrical and water meter purposes. H. E. Case was in charge of the booth.

Werner & Pfleiderer Machinery Co., White Plains, N. Y., showed an extensive line of laboratory equipment and kneading and mixing machines for every purpose. A. J. Vollrath, vice-president of the firm was in charge of the display.

Hunter Dry Kiln

The Hunter Dry Kiln Co., Indianapolis, Ind., exhibit was in charge of O. M. Ragsdale, sales manager, and Arthur B. Stonex, Eastern representative. The exhibit consisted of a complete model of the latest type of dry kiln the company has put upon the market. This was so arranged as to show both outer and inner construction including water pans, radiators and the system of circulation. In addition, samples of kiln dried rubber were shown.

A. Klipstein & Co., New York, showed an extremely complete line of chemicals for all purposes. The booth was under the direction of A. Klipstein, Jr.

The Carrier Engineering Corporation, New York, exhibited the following air conditioning devices: Humidifier which took the air of the room, drew it through a spray chamber, and diffused it through spirally constructed diffusers. Relative humidifier, aertube heater and ejector compartment. R. C. Borden and J. E. Bolling were in charge.

The Bristol Co., Waterbury, Conn., showed a full line of recording and indicating instruments for pressure and vacuum, liquid level, temperature, electricity, time motion, speed. H. L. Griggs was in charge.

The Central Scientific Co. displayed a constant temperature apparatus consisting of electrically heated and controlled drying ovens, vacuum ovens and water baths; high vacuum pumps; electrically operated laboratory devices; electric furnaces and electro-titration apparatus; oil and fuel testing equipment; physicochemical apparatus. S. L. Redman, O. T. Lewis and A. B. Carter were in attendance.

The Monarch Manufacturing Works, Inc., featured brass, iron, hard rubber and stoneware sprays for use in sulphuric acid manufacturing plants; lead valves; lead siphons; oil burners, and an automatic acid elevator, which when attached to existing acid eggs elevates acid to any desired height automatically.

The Barrett Co.

The Barrett Co.. This company has joined forces with the General Chemical Co., the National Aniline & Chemical Co., the Semet- Solvay Co., and the Solvay Process Co. in a series of booths containing an instructive and educational exhibit of the products of the company. H. G. Sidebottom was in charge of the exhibit.

Schaeffer & Budenberg, Brooklyn, N. Y., featured recording thermometers and gages; a new type of thermometer not hitherto shown. In charge of exhibit were H. V. Carlier, F. Undeutsch and A. Campbell.

The Barber Asphalt Paving Co. maintained a comprehensive exhibit of native lake asphalts and their products, with special reference to those useful in chemical plants and laboratories. Crude and refined asphalt, mineral rubber, ready roofing, asphalt shingles, preservative paints, high-grade oils for special lubricating purposes, flotation oils.

The W. W. Sly Manufacturing Company, Cleveland, Ohio, exhibit consisted of a model dust arrester and pneumatic separator, which was in full operation to demonstrate their value in connection with separating the coarse and fine materials by air suction and for collecting the finest dust.

The Diamond State Fibre Company, Bridgeport, Pa., had a very complete exhibit. It included specimens of Diamond fibre in its primal forms as well as a complete assortment of the various manufactured products, such as trunk fibre, receptacles of all kinds, punched and machined parts of all descriptions and an interesting assortment of industrial products manufactured by customers of this company. C. M. Bogert, New York manager, was in charge.

Display of Brown Instrument Co.

The Brown Instrument Company, Philadelphia, Pa., exhibit consisted of high and low temperature measuring instruments, including indicating and recording pyrometers, recording thermometers, indicating and recording instruments for pressure, vacuum, speed, time and operation. Company had a complete line of instruments in this class, pointing out the latest developments in pyrometry. In charge J. P. Goheen, secretary, and G. W. Keller, sales manager, and represented by the following: J. D. Andrews, New York district representative; M. A. Leister, advertising manager; George W. Goodman, R. B. McCafferty, C. D. Porterfield, O. W. Stowe, service engineer.

The Solvay Process Company, Syracuse, N. Y., maintained a joint exhibit with the Semet-Solvay Company. The former featured caustic soda and also exhibited a full line of the many products manufactured by the company. These were shown in glass jars and occupied a considerable portion of the booth. In addition to the foregoing a large picture was displayed which showed the layout of an alkali plant. The Semet-Solvay Company featured metallurgical coke and coke oven construction. Both pictures and actual examples were brought into use for the purpose of demonstrations.

SOME OF THE EXHIBITS AT THE NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES

New Jersey Zinc Co.
Buffalo Foundry & Machine Co.
National Aniline & Chemical Co., Inc.
Hunter Dry Kiln Company
J. P. Devine Co.
Taylor Instrument Companies

The Rubber Industry in Sumatra and Malaya

By C. D. Rockwood

Purchasing Agent, Mason Tire and Rubber Co., Kent, Ohio

(*Continued from issue of September 10, 1920*)

The yield per acre of crude rubber varies to a great extent and is effected by so many conditions, such as, locality, cultivation, type of soil, method of tapping, topography of the land, etc., that the value of any figure given will be problematical. However, 350 pounds per acre is a safe average. In some instances yield will run as high as 650 pounds and in others as low as 125 pounds per acre.

Bleeding the tree or over tapping will naturally bring up the yield per acre but will eventually be very likely to kill the trees or ruin the bark for future tapping. The Chinese estates have most of them been tapped to the limit and practically everything has been done by them to extract the last possible drop of latex.

The trees come into bearing at about four and one half years from five and on-half years on yield as follows: 5½ years, 100 lbs. per acre; 6½ years, 200 lbs. per acre; 7½ years, 300 lbs. per acre; 8½ years, 400 lbs. per acre; 12½ years, 500 lbs. per acre.

Maximum Production in Twelve Years

The trees seem to reach their maximum production at about the age of twelve years, after which the yield remains nearly stationary, rising very little from that period on.

It has been found that 10 per cent of the trees produce 40 per cent of the total yield and that 50 per cent of the trees produce 98 per cent of the total yield.

The wintering season is January, February, and March and during this period the yield falls off considerably, in many cases as much as 40 per cent. However, the average is about 30 per cent. During this period the trees shed their leaves and "rest." In April they recover and production comes up to normal and unless attacked by disease or seriously injured in tapping, there is no other "off production" period.

Some theories have been lately advanced that at the end of twenty-five years of production, the yield per tree will fall off rapidly and that it may be necessary to plant new estates. Dr. Foxworthy, government micologist of the F.M.S., is investigating this theory and is receiving the cooperation of some of the planters to find out whether there is anything in it, but it will take a long time to determine anything definite about it as very few of the plantations on which complete records have been kept, have reached that age, with the exception of the Kent Estate at Kula Lampur. This estate is twenty-seven years old and the above theory has not as yet been borne out there.

Pests and Diseases

There are many pests and diseases which attack the trees, the principal ones being white ants, deer and elephants, and of diseases, fomos, a root fungus, brown bast, and wet rot.

No method has as yet been found of completely exterminating the white ants, but coal tar, lime and coal oil have been used a great deal to combat this pest. Deer and elephants do immense damage to young plantations and in many cases it is necessary to fence whole estates to keep the deer out. Of course such measures are useless against elephants and oftentimes many acres of young trees are destroyed by the jungle beasts.

As to diseases, fomos attack young trees in the first year and from this disease alone the loss is 10 to 15 per cent in the first year trees. This disease is caused largely by decaying wood in soil.

Wet rot comes in trees ten to twenty years old and is prevalent in loose soil but is not common in stiff, clay soil. The loss from wet rot is sometimes very high and it is necessary to take out whole blocks of trees right in their prime. This disease is caused by inadequate drainage, or where the subsoil is too stiff to allow the water to drain off naturally, thus causing the water to stand on the roots of the trees constantly.

Brown bast attacks the bark but originates in the roots. It can be cured by careful treatment of both the tree and the soil about the roots, with lime and coal tar. Very little is known about this disease as yet, or what causes it, although it is dealt with in many of the books which have been written on rubber growing.

General Information and Comments

It is almost necessary for companies doing business in Sumatra to have a "resident" living in Sumatra, with full power of attorney for the company. A "residence" may be established by residing in the country two years, but this does not entail naturalization. Such companies may be incorporated in America or any other country if they have their "resident" agent.

In the case of obtaining a direct concession from the Dutch government, of virgin jungle, the personnel of the company must be Dutch and the company be incorporated under Dutch Law, but this is not the case where a concession is purchased from a private party or where a producing plantation is purchased from other parties than the government. In such an instance simply a "resident" is necessary.

In the F.M.S. there are no such restrictions and the personnel of the company may be as desired.

Income Tax and Export Duty

In Sumatra there is an income tax at present as follows: 4 per cent general tax on net income; 8 per cent on dividends above 5 per cent. An export duty is also contemplated and will probably come in a year or two.

There is no income tax in the F.M.S. but in its place is an export duty of 2½ per cent ad valorem. This figure is not constant, however, and is adjusted by the government periodically, as the price of rubber changes. Notice of these changes is given in the daily papers.

During the war there was an additional 2½ per cent for war tax but this was rescinded a few months ago.

Owing to the more favorable conditions existing in the F.M.S. and mainly on account of the fact that there is no income tax, many of the older English companies are dissolving in England and reincorporating in the F.M.S.

All companies doing business in the F.M.S. must be registered with the government, the same as at home, in America.

Tendency of Present Development

The present tendency seems to favor the F.M.S. as a place to locate new estates, but the real reason for this preference is very hard to locate and up to the time the writer left Singapore, neither Mr. Matthews nor the writer had arrived at any very definite conclusion as to this preference.

During the last twelve months there have been an immense number of new plantation companies, or Dollar Shares, as they are called, organized and floated on this market, and it is very easy to interest local capital in any such enterprise. These new companies and the larger old companies have taken up large blocks of new land in various parts of the country, and many of the most desirable locations have been taken. In addition to this legitimate development many speculators, who have been in position to know where there were desirable parcels of land have obtained concessions and are holding them for very high figures.

It seems to be generally admitted that the soil of the Malay Peninsula yields a higher quantity of latex per acre than Sumatra. More land has been available for alienation in the F.M.S. than in Sumatra. The leases in the F.M.S. are for ninety-nine years, with renewal clause, and in Sumatra the leases run for seventy-five years, with renewal clause of fifty years. There is no income tax in F.M.S. All of these reasons coupled with various rumors as to the attitude of the Dutch government toward outside capital undoubtedly have influenced the present development in the F. M. S.

From "The Mason Mail"

News from the Rubber Metropolis

Goodyear Sales Increase—Goodrich Issues "Motor Trucks of America"—Mason Tire Holds Annual Sales Convention—New Amazon Cords and Fabrics—French Rubber Purchases Bucyrus

Goodyear Sales Increase

Business conditions in Akron, Ohio, rubber center of America have recovered from the transitory slump of a few weeks ago, and now show greater stability than for several months, as indicated by sales figures of some of Akron's big rubber concerns. There is no better indication of the stability and healthy condition of the rubber tire industry, assert Akron's manufacturing leaders, than the manner in which business is steadily increasing despite the business depression throughout the country.

As indicative of the continued growth and prosperity of the rubber tire industry, sales of The Goodyear Tire & Rubber Company of Akron for August showed a substantial increase over July's sales, being $18,962,009.76 as compared to $17,185,113.06 for the previous month. As compared to sales of a year ago, last month's business was much larger. Sales in August 1919 were $17,925,193.96.

Last month's gross business brought the total Goodyear sales for the first ten months of the current fiscal year up to $181,115,964.39, or $12,200,981.56 in excess of the total sales for the fiscal year of 1919. Goodyear's business for 1919 totaled $168,914,982.83. Thus with two more months to complete the current fiscal year, present sales indicate that Goodyear's business will easily exceed $200,000,000.

Goodyear's growth and expansion have bordered on the phenomenal. Twelve years ago Goodyear's business barely exceeded $2,000,000 a year. It first passed the ten million dollars mark in 1910-11 when sales approximated $13,262,265.63. Business increased steadily reaching $63,950,399.52 in 1915-16, and jumped to $111,450,463.74 the following year.

If sales for September and October are no larger than those in August, Goodyear's business for the current fiscal year will just about double the company's business of four years ago.

Motor Trucks of America

The eighth volume of "Motor Trucks of America," published annually by the B. F. Goodrich Rubber Company, is now off the press and is being distributed to fleet owners and prospective truck purchasers through the Goodrich branches.

The handbook was first published by Goodrich in 1913 to fill a definite need for a convenient comparison of the principal specifications of American motor trucks. Efforts were made to make this year's volume more complete than in previous years and therefore of greater service to the motor truck industry. Information is included regarding weight distribution, axle and transmission ratios, bearings, etc., and as an increasing number of manufacturers are prepared to furnish either solid or pneumatic tire equipment, such options are covered as fully as possible.

One of the features of the handbook is the introductory article entitled "The Relation of Solid and Pneumatic Tires to Motor Truck Efficiency." This paper was read before the Society of Automotive Engineers and was reprinted by permission of the society.

Specifications and photographs given in the handbook were furnished and approved by the various truck manufacturers and were accordingly correct when the volume went to press.

Mason Sales Convention

The annual get-together of branch managers and salesmen of the Mason Tire & Rubber Co. was held at the home offices of the company at Kent, Ohio., September 9th and 10th. The men, numbering several hundred in all, were entertained with a banquet in the new Franklin hotel at Kent and the conferences took place in the new addition to the administration offices into which the company is about to move. The new type of cord tire, the "Mason Junior", was presented to the salesmen for the first time and its process of construction followed in the factory from raw materials to the finished product. This included inspection of the textile division which now produces all the cord for Mason cord tires from the raw cotton and also trips through the extensive additions to both the pneumatic and solid tire departments.

The sessions were very interesting and instructive and developed a high degree of enthusiasm for the new types of both pneumatic and solid tires which the Mason Company will market the coming year.

Carpenter Assistant in Northwest

L. E. Carpenter, formerly branch manager for the Goodyear Tire & Rubber Co., at El Paso, Texas, has been appointed assistant-manager of the northwest district of the firm with headquarters at Portland, Ore.

Mr. Carpenter's advancement comes to him after eight years of service with the Goodyear company. He first joined the company's forces in 1912 in Detroit where he became office manager and later a member of the sales force. He was later transferred to the dealer's sales department in Akron, and after that as a special representative of the export department in Porto Rico. In 1918 he was assigned to Denver, Colo., as special pneumatic truck tire representative and on April 1, 1919 was appointed branch manager at El Paso.

Mr. Carpenter's place as branch manager at El Paso will be filled by W. H. Vining. Mr. Vining first joined the Goodyear forces on May 1, 1918 as a salesman and was appointed zone manager in March.

New Amazon Cords and Fabrics

The new non-skid Amazon cord and fabric tires, which have been widely discussed throughout the trade during the last few months, are now in regular production, according to an announcement just released by the manufacturers, The Amazon Rubber Co., of Akron, Ohio.

The outstanding features of the new product are the change in tread design and the increase in size of both cord and fabric tires.

In addition to making the treads heavier the wearing surface has been increased by a change in the design of the non-skid lugs which are wider and so placed as to present the maximum amount of tread stock in contact with the wad surface. Both cords and fabrics are made oversize in accordance with latest approved manufacturing practice.

Amazon fabric tires are made in non-skid tread only except in the 30 x 3 size which is available in both plain and non-skid tread. Owing to decreasing demand for 4½ and 5 inch fabric tires no Amazon fabric tires will be furnished above 34 x 4.

Amazon cord tires are furnished in all popular sizes including the 30 x 3½ clincher for Ford and other light cars. Both non-skid and ribbed treads are manufactured in all sizes except 30 x 3½ which carries non-skid tread only.

Besides the regular cords and fabrics, Amazon is specializing on what it calls the Amazon Industrial Tire—a 30 x 3½ fabric tire, over-size with an extra ply of fabric.

The company is continuing the production of the widely-sold Amazon red and grey tubes. The grey tubes will be manufactured for fabric tires and the red tubes will be built oversize and of heavy gauge to properly fit the oversize cord casings.

Firestone Stock Certificates

The permanent seven per cent preferred stock certificates of The Firestone Tire & Rubber Company are ready for distribution, company officials have announced. The issuance of this stock was voted at a special stockholders meeting September 4, 1919.

Holders of stock may obtain the permanent certificates by returning the temporary certificates properly endorsed to the official transfer agents, The National City Bank, 55 Wall Street, New York City, or to The Firestone Tire & Rubber Company, Stock Transfer Department, Akron, Ohio.

French Purchases Bucyrus

The C. M. French Rubber company, Cleveland, has purchased the plant of the Bucyrus Rubber Company and will start manufacturing automobile tires.

The plant has been under lease by the Henderson Tire & Rubber company of Columbus to the first of the year. Earl Clutter, Columbus attorney for the company, and F. W. Latterner, Cleveland, closed the deal for the plant. The price was not announced.

Rubber Imports for August

Statistics recently issued by the Rubber Association of America, Inc., relative to crude rubber importations into the United States during the month of August show an increase over importations for August 1919. Importations for the month just past totalled 13,564 tons while those for August 1919 amounted to 11,067 tons. Total importations for the first eight months of 1920 amount to 181,337 tons as compared with 142,760 tons for the corresponding period of 1919. In this connection it is noticed that importations for August 1920 show a slight falling off when compared with July when importations totalled 14,695 tons.

PLANTATIONS

From	Tons
Rotterdam	61
London	239
Hamburg	9
Malacca	6
Singapore	9,745
Asahan	52
Colombo	1,529
Belawan-Deli	90
Batavia	496
Genoa	4
Sourabaya	160
Tandjong Priok	38
Telok Anson	14
Penang	67
Pt. Dickson	3
Japan and others	217
	12,730

AFRICANS

From	Tons
Havre	2
Antwerp	11
	13

CENTRALS AND GUAYULE

Centrals (Mexico and Central America)	75
Guayule (Mexico) By Rail Eagle Pass	156
	231

PARAS

Manaos	248
Para	272
Iquitos	70
	590

GUMS, WASTE RUBBER, ETC., IMPORTED FROM VARIOUS SOURCES

Waste	300 Tons
Balata	67 Tons
Miscellaneous Gums	1135 Tons

COMPARISON 1919-1920

	August 1919	August 1920	Total Importations 8 months ending Aug. 31st. 1919	1920
Plantations	8,221	12,730	121,710	161,828
Paras	2,594	590	16,637	14,514
Africans	137	13	1,724	3,657
Centrals	74	75	1,084	665
Guayule	41	156	1,442	660
Manicoba and Matto Grosso	—	—	163	13
	11,067	13,564	142,760	181,337

ARRIVALS PLANTATIONS FOR AUGUST, 1920, SHOWING PORTS OF ORIGIN AND ARRIVAL

From	Arrived at	Tons
Singapore	New York	8,471
Singapore	San Francisco	53
Singapore	Seattle	27
Singapore	Vancouver	1,194
Penang	New York	67
Genoa	New York	4
Batavia	New York	496
Telok Anson	New York	14
Sourabaya	New York	160
Japan and others	Seattle	137
Japan and others	New York	80
Asahan	New York	52
Tandjong Priok	New York	38
Colombo	New York	1,529
Port Dickson	New York	3
Malacca	New York	6
Belewan-Deli	New York	90
London	New York	239
Hamburg	New York	9
Rotterdam	New York	61
		12,730

ARRIVALS OF PLANTATIONS BY PORTS

Atlantic Ports		
New York		11,319
Pacific Ports		
San Francisco	53	
Seattle	164	
Vancouver	1,194	
		1,411
		12,730

New Goodyear Repair School

The Goodyear Tire & Rubber Company of California has announced the opening of a school of tire repairing at Los Angeles, in which free instruction will be given to persons contemplating an entrance nto the business and to those already in it.

The school which was opened last month at the new Goodyear plant is in charge of J. R. Wells, manager repair materials department and G. H. Irvin, chief instructor, and is open to vulcanizers throughout the entire west.

A complete practical course, consisting of three weeks of shop work and lectures, will be furnished. Beginning with fundamentals every step in scientfic tire repairing will be demonstrated by an expert.

Not only will the theory of tire repairing be presented, but each member of the class will be given the opportunity to put into actual practice the latest approved methods, so that when the course is completed the student will be qualified to undertake any kind of repair job from puncture to a retread.

Instruction in business methods is also a part of the course, that students taking up the business may handle it efficiently and profitably.

T. Frank McCarthy Passes Away

T. Frank McCarthy, New York representative for the rubber surface clothing department of the Clifton Manufacturing Company, of Boston, Mass., died on September 10. Mr. McCarthy had a host of friends in the rubber clothing trade and was respected and esteemed for his honorable dealings as well for his genial disposition, unfailing kindness and helpfulness to all his acquaintances in that business.

Open New Branch Office

Dwight P. Robinson & Company, Inc., with which Westinghouse, Church, Kerr & Co., Inc., has recently consolidated, engineers and constructors of New York, have established a new branch office in Youngstown, Ohio, in the Home Savings & Loan Building, in charge of C. I. Crippen.

The company recently moved its Cleveland office from the Leader News Building to the Citizens Building, and H. P. Clawson, who was for several years a member of the Chicago staff, has been transferred to Cleveland to take charge of this office.

The company now maintains branch offices in Pittsburgh, Youngstown, Cleveland, Chicago, Dallas and Los Angeles, and Sao Paulo, Brazil.

International Reduces Prices

Although it seems to be the general concensus of opinion in the tire industry that tire prices are more likely to rise than fall one company has taken an opposite view of the situation and is acting accordingly and reducing prices.

The International India Rubber Corporation of South Bend, Ind., has recently sent out a letter to its jobbers and salesmen to the effect that the company realizes that prices of general commodities have started downward. In view of this fact the company has accordingly reduced prices of Odell cords and South Bend fabrics and tubes approximately eleven per cent.

The new prices which went into effect on August 27th are as follows:

ODELL CORD TIRES

Size	Cord—Ribbed Tread Price	Cord—Rough Tread Price
30x3-A	$22.70	$23.90
30x3½-A	27.10	28.50
32x3½-D	32.30	34.00
31x4-A	37.80	39.80
32x4-D	44.00	46.30
33x4-D	45.60	48.00
34x4-D	48.50	51.10
32x4½	——	60.50
33x4½	——	62.50
34x4½-D	——	64.00
35x4½-D	——	66.00
36x4½-D	——	68.40
35x5-D	——	75.60
37x5-D	——	80.00

SOUTH BEND FABRIC TIRES

Size	Ribbed Tread Price	Rough Tread Price
28x3-A	$18.60	$19.50
30x3-A	18.80	19.70
30x3½-A	22.40	23.50
31x3½-A	——	——
32x3½-D	26.60	28.00
31x4-A	31.20	32.80
32x4-D	35.50	37.40
33x4-D	37.40	39.30
34x4-D	38.10	40.10
35x4-D	39.80	——
36x4-D	46.00	49.00
33x4½	49.00	51.60
34x4½-D	50.60	53.30
35x4½-D	52.90	55.70
36x4½-D	53.70	56.50
37x4½-Q	56.10	——
35x5-D	62.10	65.40
37x5-D	65.90	69.30

NOTE—A, Clincher Only. Q, Quick Detachable Only.
D, Quick Detachable and Straight Side.

SOUTH BEND TUBES

Size	Red Tube
28x3	$3.20
30x3	3.30
30x3½	3.85
31x3½	4.20
32x3½	4.35
31x4	4.70
32x4	5.00
33x4	5.15
34x4	5.35
35x4	5.70
36x4	6.00
32x4½	6.25
33x4½	6.45
34x4½	6.65
35x4½	6.85
36x4½	7.20
37x4½	7.80
35x5	8.15
37x5	8.55

Mason Earnings Increase

Net earnings of the Mason Tire & Rubber Company, Kent, Ohio, for the third quarter, ending July 31, were $152,011.16. This makes total net earnings for the first nine months of the present fiscal year of $841,490.18 before deduction of taxes but after deduction of depreciation. Net earnings for the first nine months of last year amounted to $195,000.00, so that current earnings are than the preceding year.

News from the Industry at Large

Coast Tire Increases Capital—Steam Bag Corporation Incorporates—Industrial Research on Black Pigments—United States Promotes Manchester—Denman-Myers Factory Now in Production

Coast Tire Increases Capital

At a recent meeting of the directors and representatives of the Coast Tire & Rubber Company announcement was made by N. J. Whelan of Eau Claire, Wis., a director of the company, that the capital would be increased to $5,000,000. It was also announced that the sale of $1,000,000 of the common capital stock has been completed.

Holmes Ives, president of the company, presided, and addresses were made by N. B. Campbell, treasurer of the company and vice-president of the First National Bank of Oakland; A. W. Shepard, secretary, formerly connected with the state corporation department; B. R. Douglas, rubber expert and purchasing agent of the company, and Arthur Hargrave, assistant sales manager and manager of advertising.

The announcement was made that the first two carloads of machinery had arrived and that nine more cars were in transit.

Work on the new factory is nearing completion. It is expected that the foundation company will turn it over within twenty days. The original plans of the company have been extended and the present building covers 60,000 square feet. It will have a capacity of 750 tires and 1000 tubes per eight hour day.

Steam Bag Corporation Incorporates

Articles of incorporation of the Steam Bag Corporation, with a capital stock of $150,000, have been filed by Denver men. Offices have been opened at 1545-1547 Broadway and a factory started at 1222 Elati Street. The officers of the company are: E. W. Ohls, president and treasurer; C. F. Miller, vice-president and general manager; W. L. Heinig, secretary; T. E. Stephenson, assistant secretary; M. A. Johnson, service and factory manager.

The steam curing bag is a vulcanizer for rubber especially rubber tires. The intense heat held in it cures at a uniform temperature the rubber both inside and outside. The steam curing bag has been used for over three years. This year the company perfected a steam curing bag large enough to handle 6, 7 and 8 inch pneumatic truck tires.

The steam vulcanizer is the exclusive property of the Denver corporation which holds basic method patents. Some of the largest tire manufacturers in the world use the Denver-made steam bag. The patents which the corporation owns cover the United States, Canada, Great Britian, France and Germany.

Industrial Research on Black Pigments

The Rubber Trade Laboratory, 235 Plane Street, Newark, N. J., announces that an industrial research will soon be started to determine the importance and relative value of the various black coloring agents used in the rubber industry.

The investigation will include the gas blacks, lampblack, graphite, bone black, and powdered coal, on the one hand, while another series of tests will be made on the pitch hydrocarbons made by treatment of gilsonite, asphaltum, petroleum residues, coaltar, and stearin pitch or candle-tar. Most of these hydrocarbons have become known in the rubber trade as "mineral rubber," although this is a misnomer.

The purpose of the investigation is to accumulate data which will stimulate the use of these products in the field of rubber and plastic compounds. All users of these materials are invited to write to Dr. Frederic Dannerth, director of the laboratory, concerning information they may have on the use of the products. It is known that many users have encountered difficulties in manipulating some of these products, and it is therefore hoped that chemists and superintendents will feel free to send to the Rubber Trade Laboratory such questions as have arisen. Collaborators and consumers are assured that this will not place them under any financial obligation to the laboratory.

U. S. Promotes Manchester

The promotion of G. W. Manchester, formerly branch manager of the United States Tire Company in Kansas City, to be district manager at Dallas, has been announced by Southwestern Sales Manager H. H. Hubbard.

Mr. Manchester is a veteran of the ranks of the company's selling force. He was a salesman for a number of years at St. Louis, specializing on truck tires. Later he became branch manager at Oklahoma City, going from there a few months ago to be branch manager at Kansas City.

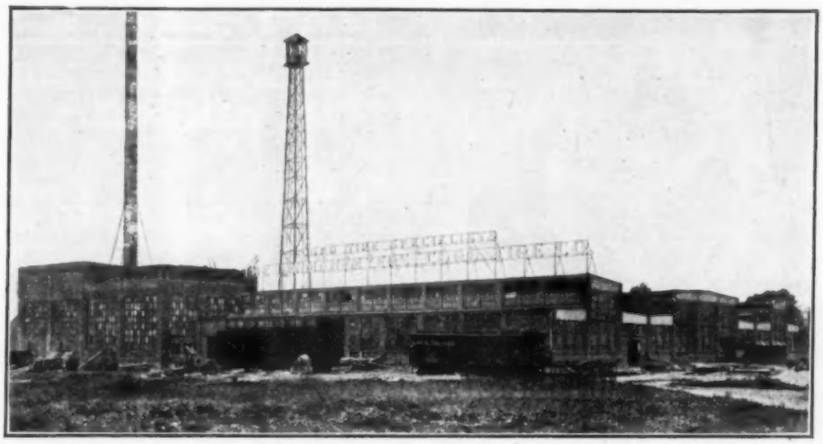
Denman-Myers Factory in Production

September 15th, marks the starting of increased production of Denman cord tires, now being manufactured by the Denman-Myers Cord Tire Company, at Warren, Ohio.

Their new plant is now completed, all machinery installed, and it is considered one of the most modern, scientifically equipped and best planned tire plants in the country.

The company specializes exclusively in the production of Denman cord tires.

Walter R. Denman, secretary and general manager of the company, is probably one of the earliest tire authorities to foresee the immense popularity of the cord tire, as compared to fabrics.



NEW PLANT OF DENMAN-MYERS CORD TIRE CO., WARREN, OHIO

"Our company," says Mr. Denman, "was one of the very first to be organized for the exclusive manufacture of cord tires. It is now generally recognized that cord tires are the coming tires, and they are rapidly replacing fabrics."

Cord tire specialists are in charge of every department and the Denman cord is already considered one of the best balanced and most practical cord tires to be put on the market.

New Philadelphia Distributor for Amazon

An announcement of unusual interest in Eastern tire circles has just been released by The Amazon Rubber Co., of Akron, to the effect that the distribution for Amazon tires and tubes in Philadelphia and adjacent territory has been turned over to the widely known firm of Charles S. Smith, Inc., of the Quaker City.

For several years, the firm of Charles S. Smith, Inc., has handled the distribution of tires and tubes in the Philadelphia district. Through the large volume of business resulting from their long experience this company has established a wide acquaintance throughout the field covered.

The appointement of this old and well known firm as Amazon distributors was, according to A. H. Leavitt, general sales manager for the factory, a direct result of an extensive increase in demand for Amazon tires in that section of the country.

Chemical Merger Announced

An amalgamation involving the largest chemical companies in the United States has been arranged whereby the General Chemical Co., the Solvay Process Co., the Semet-Solvay Co., the National Aniline & Chemical Co., and the Barrett Co., will merge interests into one corporation known as The Allied Chemical & Dye Corporation which when organized, will stand as one of the great American industrial enterprises. The linking of the companies will bring together plant, equipment and personnel of the highest order and an almost endless variety of products. The new concern, it has been announced, will have an authorized capital not exceeding $65,000,000 7 per cent preferred stock and 3,000,000 shares of common stock of no par value. These figures, taken in conjunction with the official forecasts covering the exchange of shares in effecting the merger and the bonded indebtedness of the companies involved, indicate that the corporation will have an outstanding capitalization of around $175,000,000 when it gets under way.

The companies involved in the merger plan are too well known to require introduction but a brief statement on each may not be out of place. The General Chemical Company, organized in New York in 1899, represents a combination of a number of companies, and controls several minor corporations through stock ownership. Its plants are scattered all over the country, its products including a wide range of heavy chemicals, sulphuric acid, grocery specialities, etc.

The Solvay Process Company was incorporated in 1881 to manufacture soda and its by-products, in which industry it has since forged well to the front, producing alkali and its by-products. It is closely allied with the Semet-Solvay Company, which was incorporated in New York in 1916 to take over a Pennsylvania corporation of the same name formed in 1895. The Semet-Solvay Company is interested in iron, steel, coke, copper, lumber, gas acids, explosives, chemicals and other enterprises.

The Barrett Company was incorporated in 1903 as the American Coal Products Company, the change in name occurring in 1916. Products in which it is interested, either directly or through its subsidiaries, include ammonia sulphate, carbonates, chlorides, aqua ammonia, powder quality ammonia, ammoniacal liquor, etc., roofing and building papers, roofing and paving pitch, carbolic acid, benzol, naphtha, and all coal tar products.

The National Aniline & Chemical Company was organized in 1917, combining the following properties; Schoellkopf Aniline & Chemical Works, Buffalo; W. Becker's Aniline & Chemical Works, Brooklyn; Benzol Products Company, Marcus Hook, aniline products plant of General Chemical Company, Marcus Hook; Standard Aniline Products, Inc., Wappingers Falls; aniline products plant of the Barrett Company, Shadyside, N. J.; aniline products plant of the General Chemical Company, Easton, Pa.; sales facilities, etc., of the National Aniline & Chemical Company; Century Colors Corporation. The company represents an amalgamation of the above interests engaged in the manufacture of aniline oil and salts, coal tar, colors, intermediates and dyestuffs.

Exports of Rubber for July

Statistics recently issued by the Bureau of Foreign and Domestic Commerce of the Department of Commerce, Washington, D. C., show that exports of rubber manufacturs and insulated wire cables from the United States during the month of July totalled $8,219,178. This summary does not include exports to Porto Rico or Hawaii.

The value of articles exported not including those to the two above-mentioned countries, were as follows: Belting, $308,588; hose, $248,502; packing, $140,965; boots, $64,592; shoes, $680,518; druggist's rubber sundries, $188,921; soles and heels, $113,371; automobile tire casings, $4,269,123; inner tubes, $473,413; solid tires, $265,745; all other tires, $151,160; all other manufactures of rubber, $755,487; insulated wire and cables, $558,791. Exports to Porto Rico and Hawaii were as follows: belting, hose and packing, $24,087; automobile tires, $367,769; all other tires, $26,752; all other manufactures of rubber, $70,316.

Chrome Leather & Rubber Builds

The charter of the Chrome Leather & Rubber Company, incorporated, which is to be located in Pueblo, Colo., was filed in the office of the secretary of state in Denver recently. Preliminary work is being pushed to bring about the erection of the factory there and the production of tires at the very earliest possible date.

B. Stearns of Denver, is vice-president, who is also president of the Stearns-Rogers Manufacturing and Construction Company of Denver, and a former director of the United States Chamber of Commerce; F. P. Hickman of Windsor, treasurer, who is also cashier of the First National Bank of Windsor, Colo.; F. A. Warner of Pueblo, secretary, also secretary of the Twin Lakes Land and Water Company.

The directors are W. L. Hartman, Thomas B. Stearns, E. P. Hikman, E. A. Warner, Charles E. Pond, S. Otis Hahn, C. A. Ballreich, A. R. Widick and Charles Tarbell.

Michelin Promotes Hiniker

F. R. Hiniker, for four years associated with the Michelin Tire Company on the Pacific Coast, has been promoted to the position of Northwest manager, with headquarters in Seattle. Part of his time has been spent in San Francisco and Spokane and later he traveled out of Seattle and Portland before taking his new post. He has been succeeded by F. N. Hogoboom.

McGraw Pays Dividend

At the regular monthly meeting of Directors of the McGraw Tire & Rubber Company held September 21, 1920, a quarterly dividend of one and three quarters per cent on the outstanding preferred stock was declared payable October 1 to stockholders of record at the close of business September 25.

Short Staple Cotton Tire Yarns

Advices from New England tire fabric spinning centers indicate that the abandonment of extra staple cotton as the result of recent experiments which have proven that shorter staple is fully as good as the extra staple cotton and in addition is much cheaper. As a result of the tests, it is believed that automobile tires in the future will be made generally from shorter cotton ranging in staple length from a full inch to good Texas inch and an eight, or what is termed in the mill districts as "commercial."

The majority of tires to be produced in the future, it is believed, will be cord tires, with the fabric strengthened and protected by heavy corded fabric. This construction will apply to all but the "baby size" tires, many of which are already being made from the shorter staple cotton.

The decision on the part of the fabric spinners to find some way out of the high prices which have been ruling on long staple cottons for the past several seasons led directly to the tests of the shorter staple, and it is believed that the markets for the extra staple cotton, particularly the Egyptian, will be dealt a hard blow by the change. During the past season, in particular, spinners were forced to pay almost exorbitant prices for this fancy cotton, and found it difficult to obtain supplies even at record high prices. At times during the season, cotton desireable for tire yarns was held at $1.25 per pound, when regular domestic staple could be had in practically unlimited quantities at fifty cents.

Several of the larger tire companies have been working with the fabric made from the shorter staple cotton, and have developed a fabric which they believe will be fully as good as the old expensive fabrics. The strands in the cord fabric have each thread tightly twisted, and in additional are five-ply-three-ply in construction, five threads being twisted together to make one plied thread and then three such plied threads twisted together to make the cord for the cord fabrics. By this method, there are in each cord fifteen plies of tightly twisted yarn. This cord fabric constitutes the strength and wearing qualities of the tire, bearing the tensile strain.

Tire manufacturers experimenting with the shorter staple fabric found that tires made from this fabric stood up just as well as cord tires made from the best extra staple cotton, the cord fabric in both cases lasting until the rubber covering was entirely worn away and the fabric itself worn through, this being attributed to the newly developed improved methods of rubberizing the fabric.

Open Eastern Office

The West Coast Cotton Co., a California concern, has opened Eastern selling offices at 242 Chestnut Street, Philadelphia, the office being in charge of Theo. J. Bowes of Philadelphia. The company will sell long staple cottons grown in California and Arizona to the tire fabric spinning trade in the East here.

Guarantees Against Decline in Prices

Mid-West Rubber Manufacturers' Association Issues Bulletin Regarding Hearing on Guarantees Against a Decline in Tire Prices to be held in Washington, D. C., October 5

The following important letter relating to the hearing on guarantees against a decline in tire prices, which will take place in Washington, D. C., October 5th, has been sent to all members of the Mid-West Rubber Manufacturers' Association over the signature of General Manager H. S. Vohris:

Hearing on Guarantees Against Decline in Tire Prices at Washington, October 5th.

September 23, 1920

To Tire Manufacturers:

The hearing of the Federal Trade Commission relative to the guaranteeing of prices in event of a decline against commodities—including tires,—is set for October 5th at Washington and if the Mid-West Rubber Manufacturers' Association is to be represented at this meeting, we must have your views *immediately*, expressing yourself as for or against the guaranteeing of tire prices.

Whether the Commission will hear individual cases or whether the matter will be handled as a whole, of course, has not been decided but the Board may find it necessary to make individual distinctions. The smaller manufacturers have several times expressed their opinion that a decline against prices was very harmful in their business and that it gave the larger manufacturers opportunities which the small manufacturer could not possess—that of having larger capacity and sufficient capital to manufacture and finance their production during the winter months, and selling same for a later dating with a guarantee as against a decline in price.

I think you will all agree that the guaranteeing of prices injects speculating features into our business as far as the dealer is concerned. We cannot purchase raw materials with a guarantee against a decline. If we do agree to sell tires and do not purchase materials, we are liable to find ourselves handicapped. Under the guarantee system, your dealer or jobber assumes no risk but we encourage him to contract for more than his legitimate needs in anticipation of a speculative profit. It causes over buying—it means expense to the manufacturer with no guarantee in case of a decline as to his raw materials; guaranteeing the price of his commodities is only bound to suffer a loss by making sales with such guarantee.

The practice of guaranteeing prices is unfair to manufacturers who do not give it, and to dealers who do not receive such protection. It naturally works a hardship on the small manufacturer and small dealer. It must be understood we purchase and contract for our materials six months in advance without a guarantee, in order to insure a continuous supply. The tire prices of every concern are based on actual cost plus a reasonable profit.

Inasmuch as five concerns of the country practically control the price situation, the guaranteeing of tire prices by such large manufacturers, whose volume of business may be averaged by high-priced or low-priced materials, or fluctuations of the market, seriously handicaps the small concerns who find it necessary to purchase for specified deliveries.

The reason it is important to have *an immediate reply* to this letter setting forth your views is because a questionnaire sent out by the Rubber Association of America some months ago actually brought answers from sixty tire manufacturers regrding the guaranteeing and rebating in case of a decline. Nine responded by letter setting forth their views. The report goes on to show that 53 manufacturers guarantee tires and tubes; 14 do not guarantee any articles— the guarantee extending from 120 days to six months. Fifty one of the manufacturers gave credit on future purchases and fifty one regarded it as a mutual advantage to the manufacturer—five did not.

Forty five of these manufacturers regarded the continuance of the practice as essential; twenty manufacturers felt there should be a difference between the jobber and the dealer. Twenty nine claimed there should be no difference in the handling of either the dealer or the jobber. Forty three manufacturers feel if the custom of guaranteeing is to be abolished, it would work a hardship on the manufacturer; seventeen feel it would not work a hardship. Twenty seven feel it would work a hardship on the consumer—nineteen feel it would not work a hardship on the consumer.

Advantages of Guaranteeing Prices

Advantages which are claimed by the guaranteeing of tire prices are as follows:

It enables securing orders which permits the manufacturer to produce for known requirements and to schedule his production properly throughout the year.

It permits shipments from factories and jobbers at intervals throughout the year—spring, summer and fall, thereby utilizing the machinery of distribution in the most economical way.

It tends to insure to all dealers the possession of adequate stocks to meet consumer demand at the precise time (variable from year to year and in different localities) when that demand arises.

It enables dealers, by encouraging the placing of future orders during or immediately following the active selling season, to be guided in detailing future requirements by the experience of recently expressed consumer demand.

The feeling is that the cost of carrying a large stock throughout the entire year is too great to encourage purely speculative purchasing but to us who are engaged in the tire business, we realize that many companies have used the guaranteeing of prices for the securing of large orders, which ordinarily might come to the small manufacturer in the territory, in which he is located—and that guaranteeing against a price decline is really unfair practice.

In response to this letter, it is suggested that you answer the following questionnaire:

1. Do you now guarantee prices against a decline?
2. For how long a time do you guarantee prices?
3. Do you believe it is essential to continue the custom of guaranteeing the dealer and distributor against loss on all tires and tubes on hand and unsold in case of a guarantee?
4. Do you regard it as a mutual advantage to the manufacturer to continue the offer of special settlement terms to dealers and distributors?
5. Do you think there should be any difference in guranteeing tire prices to a dealer or jobber?
6. Do you believe if the custom was abolished of guaranteeing against a price decline on tires unsold, a hardship would be worked on you as a manufacturer? And do you believe it would work a hardship on the distributor or dealer? And do you think it would work a hardship on the consumer?

Additional Considerations

There are some things of course to be considered, loss to the manufacturer, and capital investment necessary to sell winter production. A reduction in the stock carried by the dealer means smaller and more frequent shipments and would have a tendency to increase bad accounts and small bills.

It would make it very difficult to correctly gauge demand in advance and would cause a terrific manufacturing problem for the height of the season. The small dealer might not be in a position to compete with the big dealer as he could not risk carrying a stock or full line of sizes.

It might cause a shortage of popular sizes in mid-season. It might cause in the case of the small manufacturer unable to carry heavy stocks, the necessity of laying off help in dull seasons and perhaps cause an increased cost of both material and labor in season.

It must be remembered the tire industry is a seasonable business and we must consider the running of a factory for twelve months is much better than running a factory for eight months and closing it for four months.

In addition to each manufacturer answering the above questions it is hoped that they will express their individual opinions, bearing in mind that the tire business is being dominated by practically five large companies whose policies and prices must be followed entirely by the smaller tire manufacturers.

It is believed that the Federal Trade Commission is willing to pay special heed to the needs of the small manufacturer and that a reply to this questionnaire will carry considerable weight when presented to the Federal Trade Commission. Consequently, we would like as full and detailed a reply as is possible for you to give, setting forth your views.

News of the Rubber Association

Following the usual quiet period prevalent during August in the work of the Rubber Association of America, Inc., which may be explained by reason of the custom to omit all meetings during that month and the vacation season, this organization's activities have taken new life during the current month, and from all indications seem to point toward a very successful year.

Meetings

The Executive Committee of the Rubber Sundries Manufacturers' Division met in New York on September 14th and a most interesting discussion was had not only with respect to those subjects presented in the docket, but general trade conditions as well.

There was a meeting of the Executive Committee of the Tire Manufacturers' Division held in the association rooms on September 22nd at which some questions of paramount interest to all tire manufacturers were considered. There was also present at the meeting a committee representing the Federal Highway Council, composed of S. M. Williams, chairman of that organization, Mr. Dahl, vice-president of the White Company, Mr. Brosseau, president of the International Motors, and Mr. Blodgett of the Autocar Company, and these gentlemen explained the work of the council in its relation to "good roads" throughout the country.

A meeting of the Board of Directors of the association is to be held in New York on September 24th instant.

The report with regard to responses received under Questionnaire No. 102 recently sent out by the association which has been submitted to the association by the Guaranty Trust Company, which is acting as its statistical agent in the matter or questionnaires, is very gratifying, and it is hoped that Questionnaire No. 103, which is to cover the period from January 1st to June 30, 1920, will also shortly be promulgated.

Traffic Committee Meets Railroad Classification Committee

The Railroad Freight Classification Committees held hearings during the month of August concerning two subjects which are of a great deal of importance to the rubber industry. One of these subjects was with respect to the application of the Traffic Committee for a reduction in the rates applicable to pneumatic tires in carloads to points west of the Mississippi River, generally known as Western Classification Territory. The proposal of the Traffic Committee was for a reduction in ratings on pneumatic tires in carloads from second class to third class with a minimum carload loading weight of 20,000 pounds, the same as applies in Eastern and Southern territories. As a counter-proposal, the Classification Committees proposed third class rates uniformly throughout the country with minimum carload loading weight of 24,000 pounds.

The Traffic Committee appeared at this hearing and submitted statistics and other facts which it is felt conclusively upheld its contentions that third class rates as proper for this class of traffic, with a minimum carload loading weight not to exceed 20,000 pounds.

The other subject before the Classification Committees was with respect to a revision of the specifications for railroad containers for shipments of rubber footwear. It was proposed by the Classification Committees that all containers for rubber footwear be protected against losses through pilferage and other causes by additional metal straps, and analysis of this proposal developed that the expense that would be placed upon the footwear manufacturers would result in greatly increased costs totaling several hundred thousand dollars annually.

Statement was made by the Railroad Classification Committees that this investigation had brought out so much additional information, a great deal of which is submitted by the Traffic Committee, that a further investigation will be made by the carriers before any definite action is taken by them.

With respect to this matter, it is also confidently felt that the facts submitted have convinced the Classification Committees that no change should be made in the present regulations of the carriers.

Cut in Rubber Output Planned

At the moment of going to press we note the following interesting dispatch from London which appeared in *The Sun and New York Herald*:

With the bottom fallen out of the raw rubber market since the war, steps are being taken here to increase the price of this commodity. The price at the present time is 1s. 6d. a pound (about 31 cents at present exchange rates), which is much lower than was expected during the time of the boom.

The war made heavy demands on rubber, when it was used principally in the manufacture of automobile tires and electrical appliances, but immediately after the war the high prices then prevailing for rubber caused a tremendous drop in the demand for these lines.

Rubber shareholders and the greater body of buyers of goods of which rubber forms an integral part, will be interested in the British plans in this connection. The surplus of rubber has been growing every month, with the result that prices have fallen and the margin of profit is vanishing. Therefore, the Rubber Growers Association has the following suggestions:

1. That estates which are tapping daily should give a rest to a quarter of the tapping area or adopt alternate day tapping, without increasing the length or number of cuts over half the tapping area.

2. That estates which have been tapping on alternate days should give a rest to a quarter of the tapping area.

This aims at effecting a reduction in the output by 25 per cent.

The suggestion is being sent, not only to members of the association, but to plantation owners who are not members, and the belief was expressed that the association's plan to cut down the surplus in order to give prices a chance to get back somewhere near normal, would be generally adopted. The association represents about one-third of the three million acres of rubber under cultivation.

Brazilian Rubber Exports Decrease

The following statistics from Willman's "Brazilian Review" show the exports of rubber from the basin of the Amazon for the first six months of 1920:

Of the total of 18,203 tons exported from the Amazon Basin to all destinations, 9,849 tons or 54.2 per cent were fine rubbers, 1,007 tons or 5.5 per cent medium , 3,175 tons or 17.4 per cent coarse, and 4,172 tons or 22.9 per cent caucho.

Of the same total, 9,145 tons or 50.2 per cent were shipped at Para, 7,447 tons of 40.9 per cent at Manaos, 125 tons or 0.7 per cent at Itacoatiara and 1,486 tons or 8.2 per cent were in transit from Iquitos, 5,533 tons or 30.4 per cent going to Europe and 12,670 tons or 69.6 per cent to the United States.

Compared with the corresponding period last year, exports from the Amazon Basin for the first six months show shrinkage of 1,690 tons or 8.7 per cent, accounted for by decrease of 2,000 tons to Europe, but increase of 701 tons to the United States.

Exports of rubber from Manaos, Para, Itacoatira and Iquitos, six months, January to June (in tons of 1,000 kilos).—

	To Europe				
	Fine	Medium	Coarse	Caucho	Total
1919	5,807	237	340	1,149	7,533
1920	4,353	290	423	467	5,533
	To United States				
	Fine	Medium	Coarse	Caucho	Total
1919	4,453	1,301	3,218	2,988	11,960
1920	5,495	717	2,752	3,706	12,670
	Total Europe and United States				
	Fine	Medium	Coarse	Caucho	Total
1919	10,260	1,538	3,558	4,137	19,493
1920	9,848	1,007	3,175	4,174	18,203

Summary of exports for six months from the Amazon Basin by quality and destination:—

	Europe		United States		Total
	Tons	Per-cent.	Tons	Per-cent.	Tons
Fine ...	4,353	44.2	5,496	55.8	9,849
Medium	290	28.8	717	71.2	1,007
Coarse .	423	13.3	2,752	86.7	3,175
Caucho	467	11.2	3,705	88.8	4,172
Total ..	5,533	31.4	12,670	69.6	18,203

The proportion of exports of Para fine were almost evenly divided, Europe taking 44.2 per cent and the United States 55.8 per cent. In other qualities, however, the difference was very much in favor of the latter country, who alone accounted for 85.5 per cent of total exports of medium, coarse and caucho. Of total of all kinds, 69.6 per cent went to the United States.

The summary by sources and destinations is as follows (in tons of 1,000 kilos):—

	To Europe		To the United States		Grand Total	Per-cent 6
	Total 6 mo.	Per-cent	Total 6 mo.	Per-cent	6 mo.	mo.
Para	2,834	51.2	6,311	49.8	9,145	50.2
Manaos ...	2,671	48.3	4,776	37.7	7,447	40.9
Itaquatiara	10	0.2	115	0.9	125	0.7
Total ...	5,515	99.7	11,202	88.4	16,717	91.8
Iquitos ...	18	0.3	1,468	11.6	1,486	8.2
Total	5,533	100.0	12,670	100.0	18,203	100.0
Monthly Average .	922	—	2,112	—	3,034	—

Total exports from Para and Manaos during the six months were as follows:—

	Manaos	Per ct.	Para	Per ct.	Total
1920 ...	7,447	44.8	9,145	55.2	16,592
1919 ...	6,788	42.8	9,087	57.2	15,875
1918 ...	—	—	—	—	9,258

Compared with the same period last year, exports from Para and Manaos during the first six months of the year show increase of 717 tons or 4.5 per cent.

MARKETS

Manufactured Rubber Goods

NEW YORK, SEPT. 22, 1920

Little specific improvement in the general outlook in the rubber industry is to be noted, but reports from various quarters of the industry indicate that the trade is getting over the shock of the recent slump in demand and production, and officials of the rubber companies are deciding upon policies to be followed while the present abnormal conditions in the industry continue.

Bank credits are still curtailed to a considerable extent, and prospective borrowers are finding it a difficult matter to arrange credits when they have merchandise to offer as security. The banking industry in general has decided upon a policy that does not allow for loans on held merchandise, the policy being intended to help the consumer generally by discouraging the holding of goods for higher prices by making the manufacturer dump his product on the market for the best spot cash returns available when he finds himself in need of ready money.

Although this policy was determined upon with the best of intentions for all concerned, it has had the unfortunate result of forcing manufacturers in many lines to sell below cost of actual production.

Prices on many of the raw materials entering in the manufacture of automobile tires have declined in price during the past fortnight, and indications are that the price decline will be continued for some time. Although manufacturers are now in a position to turn out tires more cheaply than earlier in the year, they still have millions of dollars worth of tires made at the high cost prices ruling during the first half of the year, and it is an injustice to all concerned to force them to dump these goods on the market at valuations fixed at replacement costs.

AUTOMOBILE TIRES

Many of the smaller tire dealers in the metropolitan section are running "$1 tire sales." The plan in brief, is to give the buyer one tire at the regular selling price, and then give an additional tire of the same make and quality for an additional dollar. This plan is being used in preference to cut price sales, although there are numbers of the latter. Although this plan does not involve the better known, or advertised brands of tires, it does show the trend of conditions in the rubber tire market, as most of the sales are of firsts, rather than of seconds and factory rejects, which many of the smaller dealers normally deal in.

Manufacturers of the leading makes have slowed down production, and are doing their buying of raw materials on a strictly hand to mouth basis. There is no inclination being shown to purchase in big lots, for future requirements, even when enticing prices are offered, as manufacturers realizing that the present softness in prices is not confined to their market alone, but must naturally involve the markets which depend in a large measure upon the tire industry for an outlet. Ultra conservatism is the order of the day with the leaders in the field, and they are taking no chances of jeopardizing the value of their present high-cost tire stocks by keeping their plants running on full time and piling up stocks into an overproduction. In a market like the present one, conservatism in all things is a virtue the value of which cannot be too strongly stressed. No general price changes are to be noted.

BOOTS AND SHOES

The demand for rubber heels continues to lead in this line, and there is an active business being done. The demand is not confined to the nationally advertised brands of heels but is equally strong for unadvertised brands with which the trade is familiar. Manufacturers of rubbers and arctics are preparing for a good season, and this branch of the market is showing signs of activity. Manufacturers, however, do not look for the heavy fall buying wave normally experienced and expect to find their salesmen up against hard going, in view of the policy which the retail shoe merchants have adopted of buying only for immediate requirements. Large supplies of rubbers and arctics are daily reaching jobbing houses from the factories.

There is a better demand for rubber and composition soles reported, and the use of these articles is gradually expanding.

MECHANICAL GOODS

The slowing down of industrial plants throughout the country has been followed as a natural result by decreased buying of rubber belting, and the market for some time ahead appears to be damaged by the numerous shutdowns reported in various industries. The railroads are reported to be doing a little buying of airbrake hose, and larger quantities of the scrap hose are finding their way on the old rubber market. A routine movement in packing is reported. Hose is selling rather slowly at the present time.

MISCELLANEOUS

Demand for rubber jar rings has taken a sudden spurt during the past few weeks, and manufacturers have been doing a rushing business. With bumper crops of fruits on the market, and sugar prices falling, home canning has shown a decided improvement, and the sale of rubber rings has picked up to such an extent that dealers are rushed to keep up with the demand.

Plumbing specialities are meeting with a steady sale, the great increase in construction work throughout the country making a fairly active market on this article. Manufacturers of auto specialties are doing a steady business. Rubber balloons and other advertising novelties meet with a fair sale. The approach of colder weather has brought out a greater demand for druggists' sundries, and dealers in these articles are now doing a good business for fall shipment goods.

Cottons, Yarns and Fabrics

NEW YORK, SEPT. 22, 1920

Although the cotton acreage for the new crop is generally good, the condition of the cotton is very poor, and much damage has been caused by poor weather and the inroads of the boll weevil, the insect pests having been active this season. One of the big spot houses in the South sent out recently a questionnaire as to the inroads of the boll weevil this year, and received the following reply from an old negro grower; "Ain't nothing never been said about these here boll weevil bugs that ain't so." This, in a nutshell, sums up this angle of the market.

Despite intermittent support from the South and bull interest, the downward trend of the market continues unchecked. Southern growers are endeavoring to hold back a good proportion of the new crop for higher prices, but it is extremely doubtful if they can finance such a movement. An appeal to the Federal Reserve Board for special consideration for cotton growers was made a short time ago, but the Board did not give a favorable reply. To meet the needs of the cotton men, close to one billion dollars of active capital would have to be tied up in loans.

With prices of finished cotton goods falling from day to day, mill buyers are not active in the cotton market, and the lack of this support is keenly felt every time a bear movement gets under way. The old speculative interests which in normal times would take hold of a faltering market like the present one are

prevented by the exigencies of the financial situation from dabbling in anything of a speculative nature, and conservative investors see no reason why cotton prices should not fall in line with the general tendency to bring prices down, so there is an utter lack of speculative support.

September cotton on Monday closed at 29.10 cents per pound on the New York Cotton Exchange, with October at 28.58, November at 26.70, and July at 22.60 cents per pound.

EGYPTIAN COTTON

Despite Government agitation looking toward a reduction in the planting season, the acreage of Egyptian cotton this year is in excess of that of the past three years, and barring unfavorable weather conditions, the production for 1920-21 should exceed that of any year since before the war, the unofficial estimate for the 1920-21 season being approximately 750,000,000 pounds. With the American tire industry in bad shape, the Egyptian growers are not looking for such an active demand from the United States this season.

SEA ISLAND COTTON

The Sea Island industry is being left far behind by the flourishing long staple sections of New Mexico, Arizona, and California, and the Southern seacoast is not expected to figure prominently in the American tire fabric market again unless there should be a sudden revival in planting and cultivation and the growers once again be in a position to turn out heavy crops as in previous years.

AMERICAN EGYPTIAN COTTON

This industry, as is characteristic with young and sound businesses is expanding rapidly. One of the largest cotton growing companies, having its entire output sold to a leading tire company, is advertising in national mediums for farmers to come to the Salt River Valley and cultivate the long staple cotton, a ready sale being offered for all that can be grown. It is believed that this branch of the industry will in time supplant the Egyptian staple in the American market.

TIRE FABRICS

The market for tire fabrics is still in a jumbled condition, and no fixed market quotations are being made, prices being nominal in all instances. Tire manufacturers are not in the market for additional supplies, having sufficient fabrics on hand to take care of all their present needs. Production continues to be greatly curtailed, the spinners preferring to lay off their help and shut down rather than flood the markets with their goods. Tire fabrics offered for sale in the shoe and other industries are not being well received owing to their comparatively high prices.

DRILLS, SHEETINGS AND OSNABURGS

With raw cotton falling steadily, the mills are beginning to take cognizance of the situation, and prices are coming down. Where the mills formerly held firm, and left the market in the hands of second-hand sellers, the big New England plants have not announced spring prices appreciable under those at which they have been holding goods for some time past, and business is a little better. The spot markets for both drills and sheetings have developed additional weakness during the fortnight under review.

HOSE AND BELTING FABRICS

While the market is showing a little more easiness, dealers are holding the market nominally unchanged at quoted prices. In view of the dull demand reported on most lines, quoted prices could probably be shaded on a firm bid. A little inquiry for hose and belting fabric is reported, but sales are confined to small lots. Shoe ducks have not been affected so much by the slackened demand, and there is a fair demand for this product.

TIRE FABRICS

17¼-ounce Sea Island, combed, sq. yd.	Nominal		
17¼-ounce Egyptian, combed	—	@	—
17¼-ounce Egyptian, carded	—	@	—
17½-ounce Peelers, carded	—	@	—
17¼-ounce Peelers, combed	—	@	—

DUCKS

Belting (pound basis) lb.	.65	@	—
Hose (pound basis)	.65	@	—
*Enameling	.80	@	.85
Shoe Ducks	.80	@	—
Single filling yd.	.30	@	—
Double filling	.34	@	.36

*Price varies according to width.

DRILLS

37-inch 2.25-yard yd.	.27	@	—
37-inch 2.75-yard	.20	@	—
37-inch 3.00-yard	.19	@	—
37-inch 3.25-yard	.18	@	—
37-inch 3.50-yard	.16	@	.16½
37-inch 3.95-yard	12½	@	.12¾
37-inch 2.00-yard Southern	Nominal		
37-inch 2.00-yard Northern	Nominal		
40-inch 2.40-yard Southern	Nominal		
40-inch 2.40-yard Northern	Nominal		
52-inch 1.90-yard Southern	Nominal		
52-inch 1.90-yard Northern	Nominal		

SHEETINGS

40-inch 2.35-yard yd.	Nominal		
40-inch 2.50-yard	.21	@	—
40-inch 2.85-yard	.17½	@	—
40-inch 3.15-yard	.22	@	—
40-inch 3.60-yard	.17½	@	.17¾
40-inch 3.75-yard	.15	@	—
40-inch 4.25-yard	.14	@	.14¼

Note—In view of the unsettled conditions prevailing in the market at the present time, the prices quoted above are more or less nominal, and are not guaranteed.

BURLAPS
(Carload Lots)

	Cents Per Yard		
7 -ounce 40-inch	8.00	@	——
7½-ounce 40-inch	8.05	@	——
7½-ounce 45-inch	8.10	@	——
8 -ounce 40-inch	8.20	@	——
8½-ounce 40-inch	8.40	@	8.50
10 -ounce 36-inch	10.00	@	——
10 -ounce 40-inch	10.15	@	——
10 -ounce 45-inch	Nominal		
10½-ounce 40-inch	10.20	@	10.30

* And higher, according to width.

LITHARGE

Business in this branch of the market continues good along routine lines, and producers have a fairly satisfactory amount of business offering. With production well sold up for the remainder of the year, the producers are not pressing sales and are maintaining their prices firm on the quoted basis.

LITHOPONE

Demand for lithopone has fallen off to some extent, and small lots in second hands are now finding their way to the market. Prices for these re-sale lots are nominal and vary with different sellers. Most of the lithopone producers are sold up solidly for the remainder of the year, and the present reduced demand does not worry them, especially so in view of the fact that there is no surplus in sight. New prices just named for the third quarter of the year are ½ cent per pound over those ruling during the first three quarters.

WHITING

Producers are still experiencing much difficulty in obtaining sufficient supplies of imported chalk, and supplies are consequently somewhat restricted. Demand for this product from the rubber industry has fallen off, and consumers are taking stocks only in a routine way. The market is firmly maintained on all grades.

BARYTES

Reports from the South indicate that producers are planning an advance in prices, but no increase has yet occured. The producers are going slowly in the matter, however, as they realized that a higher market would undoubtedly attract large foreign shipments. Prices are withdrawn by most producers, who have their production for the remainder of the year taken care of by contract purchases. Few additional futures are offering. Lithopone manufacturers are in the market at the present time for all the crude barytes obtainable.

DRY COLORS

Imports are increasing steadily, but thus far the foreign stock has not had any appreciable affect on the domestic market, most of the consignments now coming in having been sold to arrive. Although demand for the domestic colors is quiet, prices are well sustained. Blacks are not selling in the rubber industry, but this lack of demand is made up for by increased buying in the paint trade, so no weakness has developed. Blues, browns and greens all hold steady under light buying.

ZINC OXIDE

Rubber manufacturers are throwing stocks of zinc oxide back on the market, and this has had a tendency to weaken prices all along the line, many sales being put through at concessions. Producers however, are maintaining the market on a firm basis for contract stuff and the producers have a good volume of future business booked, sufficient to take care of current production.

CRUDES

Demand for benzol exceeds suplies, and the market is strongly held at 33 cents for ninety per cent and 35 cents per

Chemicals and Compounding Materials

NEW YORK, SEPT. 22, 1920

With few exceptions, the price trend in this branch of the market is sharply downward, several appreciable recessions having occured during the past two weeks. Dealers are finding it a difficult matter to make heavy sales in many lines, and the accumulated offerings are making for a weaker market.

The tire industry has been a very light buyer for some time past and this reduction in consumption is giving producers some little worry. Stocks of many raw materials continue light, barytes in particular being difficult to obtain. Some imported chemicals and compounding materials are reaching the market, but generally in small lots, and are not finding a ready sale.

gallon for the pure. A number of export inquiries are in the market. Solvent naptha is strongly held at 30 cents per gallon. Toluol is offering at 35 cents from manufacturers for future delivery, but prompt shipment stuff is held at 36 cents per gallon and up. Xylol is quiet and unchanged.

INTERMEDIATES

Aniline oil is showing a little more firmness, the market being held at 30 cents per pound, drums included. Benzidine is easier. Betanapthol has developed considerable weakness during the past few weeks. Paranitraniline is showing temporary strength, and is held at $1.10 @ $1.12 per pound. Paraphenylenediamine is held about $2.70 per pound under a dull routine demand.

Current Prices for Chemicals, Fillers, Colors, etc.

Acetone, carlots	lb.	.21 @	.22
smaller lots	lb.	.22 @	.23
Acetanilid, C. P., bbls.	lb.	.52 @	.60
Acids, Acetic, 56 per ct.	cwt.	8.40 @	9.15
Carbolic, C. P.	lb.	.12 @	.20
Muriatic, 20 deg.	cwt.	2.25 @	2.75
Muriatic, 22 deg.	cwt.	3.00 @	3.25
Nitric, 42 deg.	cwt.	8.00 @	8.25
Nitric, 40 deg. cwt.		725 @	7.75
Sulphuric, 60 deg. car lots	tons	18.00 @	—
Sulphuric, 60 deg. car boys		22.00 @	—
Tartaric, crystals	lb.	.76 @	.76½
Aluminum Silicate		Nominal	
Aniline oil, bulk basis Contract		— @	—
Imported		Nominal	
Domestic		.27½ @	.30
Antimony—			
Oxide	lb.	.14 @	.15
Sulphuret, red	lb.	.22 @	.25
Sulphuret, golden	lb.	.28 @	.30
Sulphuret, crimson	lb.	.45 @	.50
Alcohol, denatured, 190 proof		1.00 @	1.04
Wood, 95 per cent		3.25 @	3.30
Ethyl, 190 proof		Nominal	
Aldehyde Ammonia		Nominal	
Ammonia, powdered		.17 @	.17½
Ammonium Carbonate, domestic	lb.	.16 @	.16½
Amyl Acetate	gal.	4.10 @	4.15
Anthracene, 80 per cent		1.00 @	1.10
Anthroquinine, 95 per ct.		3.75 @	4.25
Asbestine		Nominal	
Asphaltum, Egyptian	lb.	.20 @	.25
Domestic	ton	.30 @	.40
Barium, dust		— @	—
Sulphide	lb.	— @	—
Barytes, prime white imported	ton	Nominal	
white, domestic	ton	35.00 @	40.00
off-color, domestic	lb.	20.00 @	30.00
Southern, f. o. b. mills		23.50 @	25.00
Western, f. o. b. mills		23.50 @	26.00
Beeswax		.23 @	.65
Benzidine Base	lb.	1.25 @	1.30
Benzol, 90 per ct.		.33 @	.38½
Benzol, pure bulk, 100		.35 @	.40½
Blanc Fixe, dry, bbls.	lb.	.06 @	—
Burgundy Pitch, dom.	lb.	.08 @	.10
Foreign		.60 @	.65
Blacks, Drop	lb.	.05½ @	.15
Ivory	lb.	.16 @	.30
Carbon, gas, cases	lb.	.12 @	.30
Lampblack, R M.	lb.	.12 @	.40
Mineral blacks	ton	35.00 @	45.00
Blues, Prussian		.95 @	1.00
Soluble	lb.	1.00 @	1.05
Ultramarine	lb.	.15 @	.50
Browns, Umber, Turkey, burnt powdered	lb.	.05½ @	.07
American, burnt	lb.	.04½ @	.06
Cadmium, sulphide, yellow	lb.	1.75 @	2.00
Carbon, Disulphide, bulk	lb.	— @	—
Bisulphide	lb.	.08½ @	.09
Casein, C. P.	lb.	.35 @	.36
Castor Oil		.16 @	.18½
Caustic Soda, 76 per ct.	cwt.	4.60 @	5.00
Chalk, precipated, extra light	lb.	.05½ @	.06
heavy	lb.	.04½ @	.05
China clay, domestic	ton	10.00 @	20.00
imported	ton	19.00 @	25.00
China Wood Oil, bbls.	lb.	.17½ @	—
F.o.b. Pacific Coast		.16 @	—
Chloroform, U. S. P.		.40 @	.45
Coal Tar Pitch		— @	—
Cottonseed Oil, crude f.o.b. mills	lb.	10.25 @	—
Prime summer yellow	bbls.	13.00 @	13.50
Dimethylaniline	lb.	.95 @	1.00
Elateron		— @	—
Formaldehyde, spot	lb.	.44 @	.50
Fullers Earth, powd., carload lots		17.00 @	—
Fossil flour	lb.	.03¾ @	.05
Genasco Mineral Rubber		— @	—
Gilsonite	ton	55.00 @	65.00
Glue, extra white	lb.	.35 @	.45
medium	lb.	.30 @	.35
low grade		.22 @	.26
foot stock		.19 @	.22
brown foots		.19 @	.22
common bone		.18 @	.21
Glycerine, C. P. (drums)	lb.	.28½ @	.29
cans		.30½ @	.31
Graphite, flake (bbl.)	lb.	.14 @	.20
powdered (bbl.)	lb.	.05 @	.19
Green, chrome, R. M.	lb.	.42 @	.70
Ground glass (fine)	lb.	.03½ @	.04
Hexamethylene	lb.	1.95 @	—
Infusorial earth, powd'd.	lb.	.02 @	.035
bolted	lb.	.035 @	—
Iron oxide, red, reduced grades	lb.	.13 @	.15
red, pure, bright	lb.	— @	—
Hexamethyenetetramine	lb.	2.25 @	2.50
Kaolin		— @	—
Lime, hydrated		— @	—
Lead, red, dry (casks)	lb.	.12¼ @	.12½
sublimed	lb.	— @	—
white, basic carb.	lb.	.10½ @	.11
white, basic sulp.	lb.	.10 @	.10¼
Lime flour	lb.	— @	—
Litharge (casks)	lb.	.11¾ @	.12¼
English	lb.	— @	—
Lithopone, domestic, bbls.	lbs.	.08½ @	.08¾
in bags	lb.	.08¼ @	—
M. R. X.		— @	—
Magnesia, carbonate	lb.	.18 @	.19
calcined light	lb.	.60 @	.65
Magnesite, calcined, pwd.	ton	50.00 @	65.00
Magnesia, Oxide, heavy		— @	—
Light		— @	—
Extra light		— @	—
Napthalene	lb.	.14½ @	.16
Nirobenzol		.15 @	.16½
Naphtha, motor gasoline, (steel bbls.)	gal.	.31 @	—
68 @ 70 degress (steel bbls.)	gal.	.38 @	—
70 @ 72 degrees (steel bbls.)	gal.	.39 @	—
73 @ 76 degrees (steel bbls.)	gal.	.41 @	—
machine (steel bbls.)	gal.	.50 @	—
Oil corn, crude factory	cwt.	11.31 @	—
corn, ref. (bbls.)	cwt.	16.26 @	—
linseed, (bbls.)		1.22 @	—
In carloads, spot		1.24 @	—
tank cars		1.16 @	—
Oil palm, Lagos	lb.	.10¼ @	.10½
Niger		.10 @	—
pine, yellow	gal.	1.00 @	—
distilled	gal.	1.25 @	1.35
rapseed, refined	gal.	1.40 @	—
rapseed, blown	gal.	1.60 @	—
rosin, first rectified	gal.	.74 @	—
second run		.77 @	—
tar (commercial)	gal.	.38 @	.40
Oleum Acid, 20 per ct.	ton	28.00 @	30.00
Orange mineral, Amer.	lb.	.15½ @	.16½
imported	lb.	Nominal	
Ozokerite		Nominal	
Paraphenylenediamine	lb.	2.70 @	2.85
Petrolatum, bbls., amber	lb.	.06 @	.07
pale yellow	lb.	.07½ @	.08½
Paranitrosodimethylanaline		— @	—
Parafin, refined, 118 @ 120 m. p.		.11¼ @	—
127 @ 129 m. p.		.10½ @	—
137 @ 140 m. p.		.12 @	—
Phenol		.12 @	.16½
Pumice		.05 @	.10
Pine tar kiln	bbl.	15.00 @	—
Pitch	bbl.	10.50 @	—
Plaster of pais	bbl.	4.25 @	5.00
Red Tuscan	lb.	.22 @	.30
red (American)	lb.	.12 @	.14
Indian (English)		.14 @	.18
Standard	lb.	— @	—
Rosin (common to good)— 280 lbs.		14.25 @	—
Rotten stone, powdered	lb.	.02½ @	.04½
Rubber, substitute, black	lb.	.13 @	.17
white	lb.	.15 @	.24
brown	lb.	.20 @	.25
Rosin Oil, first rectified		.74 @	—
Second rectified		.77 @	—
Third rectified		.93 @	—
Fourth rectified		1.03 @	—
Soda ash, light 58 pct.	cwt.	2.75 @	3.00
Sodium Nitrite .96@98 pct.		.16 @	.17½
Solvent Noptha, crude, hvy.		.30 @	.35½
Soya Bean Oil, bbls.	lb.	.13½ @	—
Sellers, tanks, f. o. b. Coast		.09¼ @	.09½
Stearic Acid, single		.19 @	—
Shellac, fine orange	lb.	Nominal	
Sulphur Chloride, drums		.06½ @	.16
Shellac T. N.	lb.	.95 @	—
Bleached, ordinary	lb.	.90 @	1.00
Bleached, bonedry	lb.	1.10 @	1.20
Silex (silicia)	ton	25.00 @	40.00
Soapstone, powdered	ton	15.00 @	20.00
Starch, corn, powd.	cwt.	5.12 @	—
pearl		4.97 @	—
Jap potato, duty pd,	lb.	.06½ @	.07
Sulphur, crude	ton	— @	—
100 pounds		— @	—
roll		3.45 @	—
commercial superfine		2.10 @	2.35
Talc, American	ton	18.00 @	20.00
French	ton	30.00 @	—
Thiocarbanilid		— @	—
Toluol, pure, in drums	gal.	.35 @	.40½
commercial		.30 @	.32
Tripolite earth	lb.	.01½ @	—
Turpentine, pure gum— spirit	gal.	1.49 @	—
wood	gal.	1.45 @	—
Venice, artificial	gal.	.15 @	.16
true		3.25 @	3.30
Vermilion, English	lb.	1.55 @	1.60
American		.25 @	.30
Vorite		Nominal	
Wax, beeswax, crude yel.	lb.	.24 @	.26
refined		.33 @	.50
Bayberry		.37 @	.39
ceresin, white	lb.	.15 @	.16
yellow		.14 @	.15
Whiting, commercial	cwt.	1.40 @	—
Gilders Bolted		1.45 @	—
Paris white, Amer.	cwt.	1.75 @	—
English cliffstone	cwt.	2.00 @	—
Xylol (gal.) pure		.45 @	.50½
Commercial		.30 @	.35½
Zinc Oxide, French process, red seal		.11½ @	.11¾
green seal		.12½ @	.12¾
white seal		.13½ @	.13¾
Leaded Grades— Commercial, lead free		.08½ @	.10½
5 per ct. lead sulphate		.09 @	.09½
10 per ct. lead sulphate		.09½ @	.09¼
20 per ct. lead sulphate		.08¾ @	.09
35 per ct. lead sulphate		.08¼ @	.09½
Zinc Sulphate		.03½ @	.04½

Crude Rubber

NEW YORK, SEPT. 22, 1920

Decline has followed decline in the market for crude rubber, and prices are establishing record low levels almost daily. Tire manufacturers are not showing any interest in the crude material, and to all intents and purposes are practically out of the market. The suspension in tire manufacturing has served to demoralize the market for crude not only by the stoppage of additional buying for the account of the tire manufacturers, but also by the turning back onto the market of current arrivals of crude rubber which were intended for delivery to tire makers. While the manufacturers are not trying to cancel their contracts, and push their loss onto the importers, they are offering their stocks for re-sale at prices considerably under those which they paid to import the rubber. Some of the manufacturers are having their contract shipments held back in order to prevent any over-accumulation of supplies in this country.

Manufacturers of druggists' sundries and other smaller users of the crude material are doing a little buying, but this support is not of sufficient volume to buoy up the market, as the buyers for these concerns take stocks only in small lots, and under present market conditions are able to pick up odd lots at very satisfactory prices.

Importers who have been for months watching their market prices go down, and with them, not only their prospective profits but actual money invested in the rubber, are pinning their faith on the tire industry and hoping for an early resumption of manufacturing on a large scale. As one importer expressed it, even though the public is not buying heavily of tires at the present time, conditions are bound to improve, as the tire is too essential an

article to receive anything but a temporary set-back. These optimistic brokers believe that tire manufacturers this year were overly-ambitious and set for themselves too high a production for the good of the trade and country generally. The announcement of a reversion to pre-war prices on all vehicles manufactured by the Ford Motor Co. is taken as a hopeful sign.

Prices on many varieties of crude rubber are now at record low prices, and there are no signs that the decline has yet been checked or that prices have reached rock bottom. The market is at present going through what all other large markets have experienced, and but few realized, a well- regulated panic, the regulator in this instance being the Federal Reserve Board. The industry is bound to come through, as others have already done, and the outlook is far from as gloomy as some pessimists in the trade would have it. The first hopeful sign in some time was the reported sale last week of a lot of 400 tons of smoked sheets for December delivery, the seller claiming to have put the transaction through at a price fractionally above that now ruling. Other large sales of this type would go a long way toward heartening the market.

Current market quotations, corrected to date, are given below:

Ceylons			
Smoked sheets ribbed, spot	.26	@	.26¼
Smoked sheets ribbed, Sept.	.26½	@	—
Smoked sheets ribbed, Nov.-Dev.	—	@	.24½
Smoked sheets ribbed, Jan.-June	.29	@	—
Smoked sheets plain, spot	.25	@	.25¾
First latex pale crepe	.24½	@	.25½
Amber crepe, No. 1	—	@	.24
Amber crepe, No. 2	—	@	.23
Amber crepe, N. 3	—	@	.22
Clean brown crepe	.24½	@	.25
Light clean brown crepe	.24	@	.24½
Roll brown crepe	.22	@	.23
Grand Central crepe	Nominal		
Africans			
Rio Nunez string	—	@	—
No 1 Benbuella	.16½	@	—
No. 2 Benguella	.14	@	—
Paras			
Up-river fine	—	@	.26½
Up-river medium	—	@	.25
Up-river coarse	—	@	.18
Caucho ball	—	@	.19½
Islands fine	—	@	.23¾
Islands coarse	Nominal		
Maderia fine	—	@	.33
Knapsack	.40	@	.42
Centrals			
Corinto prime	.18	@	.19
Esmerelda prime	.17	@	.18
Miscellaneous			
Guayule wet	Nominal		
*Balata block Panama	.45	@	—
Balata sheets	Nominal		
Cameta	.16½	@	.16¾
Palembang	.08½	@	.09
Prime Surinam sheets	.34	@	—

*Nominal

Scrap Rubber

NEW YORK, SEPT. 22, 1920

Reclaimers are not lending any strength to the market for scrap by placing orders, and prices have continued their steady decline during the past two weeks. Prices are being marked lower and lower from day to day by scrap wholesalers, but still the prices are not yet attractive enough to induce consumers to enter the market for large lots. Users of the scrap are buying in a hand to mouth manner, taking just enough to cover current consuming requirements, feeling doubtless, that any heavy increase in buying would result in a stronger market. At the present time, however, buyers are having things all their own way.

Stocks continue to accumulate in wholesalers' hands, and some of the jobbers are beginning to find it difficult to handle all of the scrap which is being offered by the gatherers. Prices on inner tubes have shown a sharp decrease since our last report, being now offered down to 8.00 to 8.50 cents per pound, while other varieties have developed similar weakness during the period. Scrap air brake hose is beginning to find its way back on the market in larger quantities. Collections of old tires, both truck and passenger type, are more liberal and supplies are expected to increase with the arrival of colder weather and the ending of the touring season.

	Cents per Pound.		
Solid Tires	1.50	@	2.00
Auto Tire Peelings	2.50	@	2.75
Truck Tires	2.00	@	2.25
Black Rubber	1.25	@	1.50
Boots and Shoes	5.75	@	6.00
Arctics, trimmed	4.25	@	5.00
Arctics, untrimmed	4.00	@	4.12½
Tire—Automobile	1.25	@	1.50
Bicycles, pneumatic	1.00	@	1.50
Mixed Hose	.75	@	1.00
Air Brake	1.50	@	—
Inner Tubes, No. 1	8.00	@	8.50
Inner Tubes, No. 2	5.50	@	6.50
Red Tubes	4.00	@	5.00

Dunlop May Increase Capital

Word has been recently received to the effect that an extraordinary general meeting the the Dunlop Rubber Company was held in London on Friday, September 10. The purpose of the meeting was the consideration and, if acceptable, the voting upon resolutions making for an increase in the company's capital. The resolution's follow.

1. That the capital of the company be increased to £20,000,000 by the creation of 12,500,000 additional ordinary shares of £1 each, ranking for dividend, in respect of capital, and in all respects pari passu with the existing ordinary shares of the company.

Extraordinary Resolution

2. That with a view to the capitalization of a sum of £7,500,000, consisting of premiums received on shares issued by the company and of indistributed profits standing to the credit of the Reserve Fund of the company, this general meeting hereby sanctions—

(a) The payment of a bonus of three pounds, free of income tax, on each of the 2,500,000 ordinary shares of this company to the members who on the 6th day of September, 1920, were registered as the holders of such shares.

(b) The application in payment of such bonus of so much of the reserve fund as consists of premiums received on the issue of shares by the company, and of so much of the residue of the said fund as may be required for the purpose of completely satisfying the same.

(c) The satisfaction of such bonus by the distribution and allotment rateably amongst the members aforesaid of 7,500,000 ordinary shares of £1 each in the capital of the company credited as fully paid up and ranking for dividend on an equal footing with the 2,500,000 ordinary shares of the company already issued.

American Rubber Patents

ISSUED AUGUST 31, 1920

1,351,015—To Arthur V. Anderson, and Alfred M. Morgan, Fort Worth, Texas, assignors to Ford Tire & Rubber Co., Fort Worth, Texas. Tire-casing.

1,351,156—To Cuthbert Burnett and Albert Edward Burnett, Trowbridge, England. Manufacture of rubber tires of the solid or band type.

1,351,291—To Frank Hornquist, Mount Jewett, Pa. Rubber-sole.

1,351,400—To Bert Pangrazie, Scottsville, N. Y. Tire-valve.

1,351,463—To Newton Benjamin, Elmira, N. Y. Tire-casing and method of making same.

1,351,536—To John M. Ramage, Uniontown, Pa. Cushion-tire.

1,351,576—To Zachary Katchuk, Pittsburgh, Pa. Tire.

1,351,664—To Harvey M. Laley, Monessen, Pa. Tire-armor.

1,351,670—To Franc D. Mayer, Chicago, Ill. Tire filler and method of making same.

1,351,691—To Harry Charles Ridout, Bournemouth, England. Resilient heel or lift for boots and shoes.

ISSUED SEPTEMBER 7, 1920

1,351,784—To George Orbin, Hoboken, Pa., assignor one-third to Charles Milton Hays, Hoboken, Pa. Spring cushion tire.

1,351,856—To Henry M. Lambert, Portland, Ore. Method of manufacturing tires.

1,351,870—To James F. Pierce, Glynrich, Del., assignor to American Vulcanized Fibre Co., Wilmington, Del. Apparatus for forming tubes.

1,351,873—To Percy Phelps Sanford, Woodbridge, N. Y. Fountain pen.

1,351,894—To James H. Dalbey, Elgin, Ill., assignor to Elgin Rubber Ace. Company, Elgin, Ill. Resilient core for tires.

1,352,008—To George L. Lawrence, Jr., Melrose, Mass., assignor to Boston Rubber Shoe Co. Rubber shoe and method of making the same.

1,352,074—To Joseph N. McFate, Phoenix, Ariz., and Herbert L. Glaze, Los Angeles, Cal. Tire.

1,352,088—To Thomas Saia and Mike Butera, Pittsburgh, Pa. Ice-creeper.

1,352,093—To Marcus A. Shotwell, Miami, Fla. Tire cover or protector.

1,352,161—To Theodore A. Willard, Cleveland, Ohio. Method of forming hard-rubber storage-battery jars.

1,352,163—To John A. Wilson, Elizabeth, N. J., assignor to Duratex Company, Newark, N. J. Coated fabric and process of producing same.

1,352,164—To Charles W. Yelm, Denver, Colo., assignor to Gates Rubber Co., Denver, Colo. Repaired tire.

1,352,170—To Harry L. Boyer, Trenton, N. J. assignor to Joseph Stokes Rubber Company, Trenton, N. J. Method of making rubber storage-battery jars.

1,352,274—To Frank L. Johnson, Akron, Ohio. Collapsible tire-core.

1,352,305—To David H. Moore, Port Clinton, Ohio. Vehicle-tire.

1,352,370—To Charles Robert Irvine, Petrolia, Ontario, Canada. Vehicle-tire.

1,352,383—To Ralph Earl Riley, Akron, Ohio, assignor to Miller Rubber Company, Akron, Ohio. Mechanism for manufacturing rubber bathing-caps.

Notes of the Cotton Market

In both Lower and Upper Egypt, including Fayoum, the temperature and general weather conditions have been ideal for the cotton crop. The water supply has been ample with a few exceptions at the tail ends of canals.

The Commercial Company of Egypt has received the following report on the cotton market; "Forecasts about proportion of qualities, although yet premature, point to a lower percentage of extra grades in comparison with last year. We expect to see still lower prices later, consequent on the moving of the crop in face of unpromising trade conditions."

Southwestern cotton men have organized the Cotton League of California, Arizona and New Mexico, with headquarters at Los Angeles. The Association will seek to protect the industry against insect pests and to improve the quality of cotton in the Southwest. In addition, legislation for the improvement of shipping conditions will be sought.

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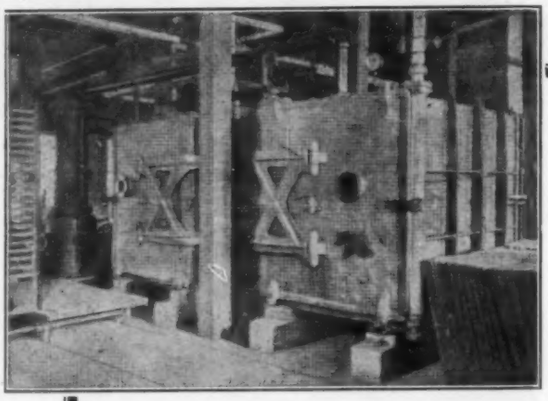

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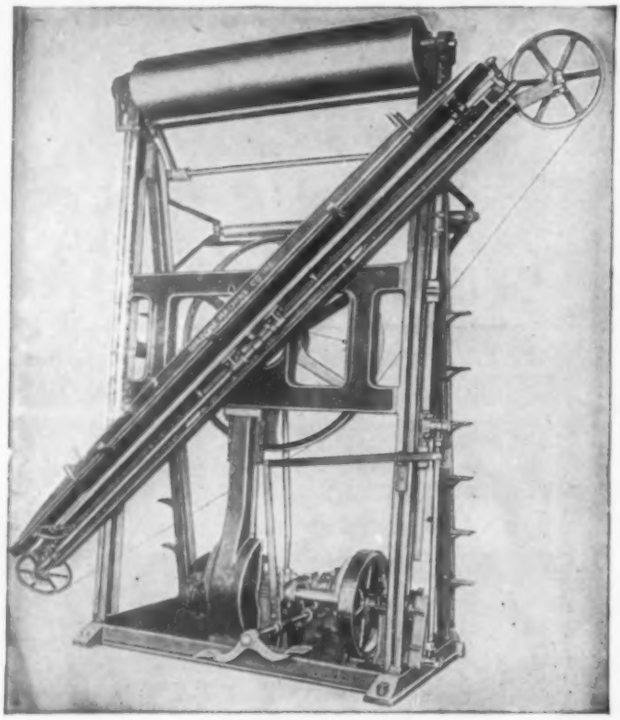

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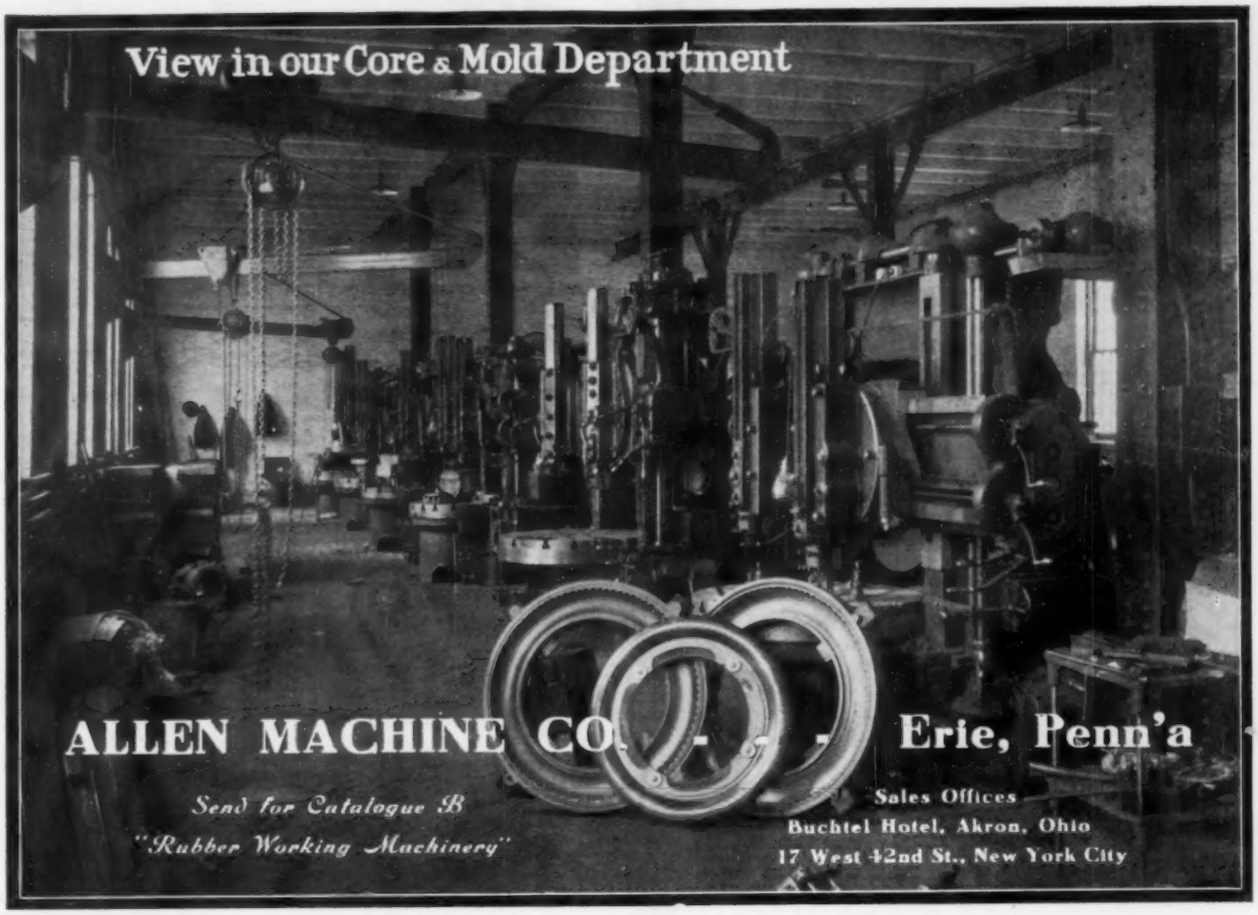
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Index to Advertisers

A

Akron Advertising Agency..... 500
Akron Equipment Co..... 542
Allen Machine Co..... 533
Ames, B. C., Co..... 533

B

Battelle & Renwick..... 497
Biggs Boiler Works Co..... 543
Binney and Smith 529
Brander & Curry..... 540
Brighton Mills 535
Butcher, L. H., & Co..... 499

C

Cabarrus Cotton Mills..... 530
Canfield, H. O., Co..... 542
Cleveland Rubber Mold Fdy. & Machine..... 534

D

Daigger, A., & Co..... 540
Devine, J. P., Co..... 531
Dunbar, Wilmer 538
Duncan, J., Co..... 543

E

Essex Rubber Co..... 499

F

Frazar & Company..... 531
Fulper, Edward B..... 542

G

Gammeter Co., The W. F..... 537
General Electric Co..... 498
General Magnesite & Magnesia Co..... 539
Grant, Watson & Co., Ltd..... 539

H

Harshaw, Fuller & Goodwin Co..... 497
Henderson, F. R., & Co..... 532
Hodgman Rubber Co..... 536
Hunter Dry Kiln Co..... 534
Hyde Mfg. Co..... 497

J

Jenckes Spinning Co..... 538

K

Kuhlke Machine Co..... 540

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Index to Advertisers

(*Continued from page 539*)

L

Laidlaw, Kelley and Co., Inc..... 537
Land, J. H. Co..... 535
Liebstein, T. B..... 540

M

Manhasset Mfg. Co..... 535
Marlboro Cotton Mills..... 542
McGill Mfg. Co..... 538
Miller Rubber Co..... 537

N

National-Standard Co..... 540
National Aniline & Chem. Co., Inc..... 529
Niagara Sprayer Co..... 534

P

Peters Brothers Rubber Co., Inc..... 542
Phoenix Rubber Co..... 537

R

Rare Metals Products Co..... 536
Rubber Imp. and Dealers Co., Inc..... 540
Rubber Products Co..... 537

S

Schrader's Sons, A., Inc..... 497
Solvay Process Co., The..... 538
Somerset Rubber Reclaiming Works..... 529
Spadone Machine Co..... 532
Stamford Rubber Supply Co..... 537
Steel Equipment Corp..... 541

T

Taylor, Armitage, Eagles Co., Inc..... 535
Textile Finishing-Machinery Co..... 540
Turner, J. Spencer Co..... 536
Typke & King, Ltd..... 542

U

United Shoe Machinery Corp..... 530
U. S. Rubber Co..... 495
U. S. Rubber Reclaiming Co..... 494

V

Vaughn Machinery Co..... 544
Vulcanized Rubber Co..... 534

W

Wood, Chas E..... 537

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